Columbus Dealer Code Governs Discounts, Prices, Terms

(*Concluded from Page 1, Column 3*)

to exceed ten (10%) per cent of the installed price, is to be allowed. Employes or inmates of these institutions do not qualify for this discount.

(c) Builders of individual homes for sale or contract are not eligible to any discount either for their own use or otherwise.

(d) No utility, manufacturer, farm bureau cooperative buying association, fraternal organization, etc., qualifies for any discount whatever, regardless of whether for company use or employe use. No purchase orders will be honored except for regular retail delivered price.

(e) National user factory contracts.

(f) Sales to apartment house purchasers.

3—**Discontinued Models:** It is suggested that the minimum retail selling prices of bona fide discontinued models shall be established by contract under the provisions of the Fair Trade Act of Ohio.

4—**Ice Box Allowance:** It is suggested that a prohibition against any allowance, directly or indirectly, for an ice box trade-in shall be written into any contract establishing the minimum retail selling price as referred to in rules 1 and 3 hereof.

5—**Free Home Demonstrations:** It is suggested that no free home demonstrations are to be made or advertised.

6—**Financing:** (a) It is suggested that charges for financing retail conditional sales shall be a minimum of ½% per month to consumer added to the unpaid balance at the time of purchase.

(b) No cash discounts to be given.

7—**Inaccurate Advertising:** (a) A dealer shall not use, or cause to be used, advertising, whether printed, radio, display, or of any other nature, which is inaccurate in any material particular or misrepresents merchandise (including its use, trade-mark, quality, quantity, size, grade, origin, material, content, or preparation, or credit terms, values, policies, or services); and shall not use or cause to be used, advertising and/or selling methods which tend to deceive or mislead the customer.

Under terms of the distributor-dealer agreement sponsored by the association, the dealer agrees to sell his products at not less than the minimum retail prices established by the distributor. The latter reserves the right to change prices without notice, as well as to add products to the original list, but agrees to make the changes by written amendment to the original contract.

The contract does not apply to sales made by the dealer in closing out his stock preparatory to discontinuing delivery, provided the distributor is given 10 day's notice of the sale and a chance to buy at prevailing stock prices; to sales of damaged goods, provided the distributor consents and notice is given to the public; and to sales made under a court order.

"Violation of this contract," the agreement reads, "shall constitute unfair trade, and will render the guilty party liable to suit as provided in the Ohio Fair Trade Act."

Officers of the Electric Dealers Association, in addition to Mr. Dougherty, are: C. C. Robinson, president; S. M. Cole and H. W. Emswiler, vice presidents; and F. P. Boyland, treasurer. Directors are A. W. Van Hise, J. J. Goldsoll, J. W. Loos, E. L. Foster, G. L. Thompson, and R. W. Haines.

Beatty Manages Range Sales for Westinghouse

MANSFIELD—Appointment of R. M. Beatty as manager of range sales for Westinghouse Electric & Mfg. Co. has been announced by Reese Mills, manager of the company's range and water heater department. The appointment was effective June 1.

Mr. Beatty has had several years of experience in the electrical manufacturing industry. He has been with Westinghouse for seven years, the past three as sales promotion manager of the northwestern district, with headquarters in Chicago.

Previous to joining Westinghouse, he was for two years with Lindemann & Hoverson Co., Milwaukee, and for three years with Domestic Electric Appliance Co., Peoria, Ill.

In his new post, Mr. Beatty will correlate the various advertising, promotion, and selling activities of the department, and will maintain contact with the field organization for the most active sale and promotion of electric ranges.

Wisconsin Fair Trade Act Held Legal

(*Concluded from Page 1, Column 4*)

identified by an exclusively owned trade-mark and sold in free competition with other goods of the same class.

"It allows a single producer or owner of commodities sold under his trade-mark and distributors thereof to make, at their option, contracts stipulating minimum resale prices for such commodities when sold at retail by or under such trade-mark, to the end that distributors thereof may be facilitated by insuring dealers a profit, and that good will be protected by keeping known and identified merchandise free from deceptive use, such as 'loss leader' and 'bait selling,' and thus cheapening it in the public's estimation.

"Therefore, it is not the primary purpose of the fair trade act to merely prohibit price-cutting for the purpose of regulating prices, but rather to prohibit that practice in a legitimate legislative attempt to afford protection to the validly-acquired rights of others . . .

"Thus, instead of authorizing price fixing . . . the statute authorizes an effective check of any abuse in that respect," the court's opinion concludes.

Midwest Production to Reach 800 a Day

(*Concluded from Page 1, Column 4*)

40x450 feet, is expected to be completed this week. This building will be used for storing finished cabinets. A new addition to the press room, 60x160 feet by 41 feet high, served by a traveling overhead crane, will be finished by Sept. 1, and a new woodworking shop, 50x80 feet, will be completed in about a week.

Revamping of plant equipment will include installation of 3,000 feet of overhead mono-rail conveyor to serve the metal, finishing, and assembly departments with cabinet parts. Another 450 feet of power-driven conveyor will be installed on the assembly line, and another porcelain furnace will be added.

The new additions and equipment will enable the company to produce between 500 and 800 domestic cabinets daily, and will provide for line production on commercial cabinets and cases, Mr. Battles states.

Four New Distributors of Servel Equipment Named

EVANSVILLE, Ind.—Four new distributors have been appointed by Servel, Inc. to handle its line of commercial electric refrigeration and air-conditioning equipment.

They are: Orient Air Conditioning & Commercial Refrigeration Co., Jersey City, N. J.; Acme Refrigeration Co., Fall River, Mass.; Stubbers Refrigeration Co., Cincinnati; and Newstrom & Davis, Denver contracting firm.

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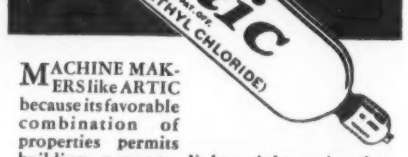

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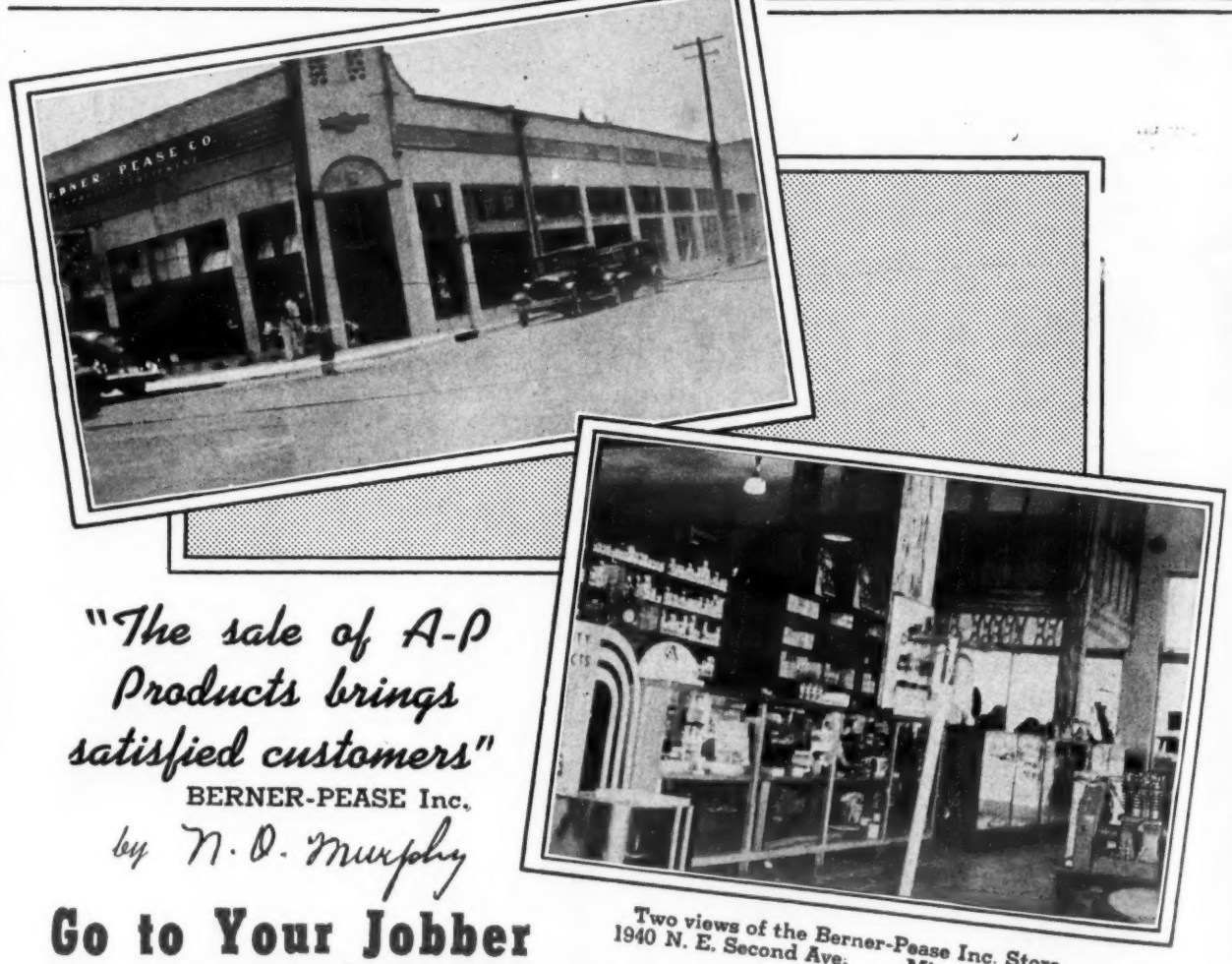

"The sale of A-P Products brings satisfied customers"
BERNER-PEASE Inc.
by N. D. Murphy

Two views of the Berner-Pease Inc. Store 1940 N. E. Second Ave. Miami, Florida

Go to Your Jobber For Your A-P Controls

More service men are using A-P Controls on their air conditioning and refrigeration jobs. They are finding that the steady performance of their A-P equipped units brings them satisfied customers.

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No rubber breather cap. Moisture-proof. Has corrosion-proof, non-metallic poppet and seat that close-off positively. Ample size, easily removable filter. All wearing parts renewable. Use it as standard equipment or for replacement . . . on Methyl Chloride, Freon and Sulphur Dioxide systems. Write for Bulletin O-5000.

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ASHVE Studies Health Phases Of Air Control

Speakers Stress Need For Further Study Of Fundamentals

SWAMPSCOTT, Mass.—The growing importance of continued investigation into the fundamentals of air conditioning in their effect on human health, efficiency and comfort and the improved adaptation of air conditioning to modern building construction were keynotes of the annual summer meeting of the American Society of Heating and Ventilating Engineers held here June 24 to 26.

Meetings of the committee on research and the reports of technical subcommittees stressed the opportunity ahead of air conditioning to chart a course which will expand the industry into new fields of public service, including the treatment of disease.

Going hand in hand with the enlargement of the program to seek new data and improve existing research to these fundamentals, such problems as more economically and effectively applying air conditioning were the chief subjects of discussion. In this connection, the question of heat transfer, solar radiation, the more accurate determination of cooling loads, ventilation requirements, and performance of air-conditioning equipment came in for particular attention.

So far as research activities of the society were reflected at this year's

(*Concluded on Page 2, Column 1*)

Credit Group Urges Time Payment Limit

SPOKANE, Wash. — Establishing maximum time limits for payments on major household appliances, a recommendation by the department store group of the National Retail Credit Association was adopted by the latter at its 25th annual convention held here recently.

Recommended time payment limits for appliances are: electric refrigerators, 24 months; stoves and ranges, 18 months; furniture, 18 months; washing machines and radios, 12 months.

It was also recommended that instalment credit terms should not in any case be extended.

Classes in Refrigeration Offered by 75 Colleges

DETROIT—More than 75 universities and colleges throughout the country are now offering special courses in air conditioning and refrigeration, especially as it applies to small home units, according to E. L. Sylvester, sales manager of residential air conditioning of Nash-Kelvinator Corp.

Mr. Sylvester recently completed a survey of air-conditioning trends in United States.

"Massachusetts Institute of Technology leads all other schools in

(*Concluded on Page 2, Column 3*)

Georgia Power Sales Up 40% for 5 Months

ATLANTA—Refrigerator sales of Georgia Power Co. for the first five months of 1937 totaled 4,352 units, and range sales totaled 2,048 units, respective increases of 40% and 38% over the same period last year.

Sales of 1,439 water heaters and 114 ironers exceeded last year's five-month sales of these articles by 212 and 37 units, respectively. Washer sales, however, dropped from 115 units in 1936 to 98 units this year.

Plumbers Must Install Dayton Cooling Jobs

DAYTON—The plumbing inspection bureau of Dayton has ruled that as long as water is used in connection with air conditioning and goes into a waste connection, a plumbing permit must to be obtained by all air-conditioning distributors and dealers in this city and a master plumber must make the installation.

James P. Murray, chief city plumbing inspector, said that an air-conditioning unit using water has been classified as a plumbing fixture. As such, it also comes under the city's new "sticker" ordinance which went into effect Jan. 1, requiring all persons or firms selling new or used plumbing fixtures to place certain stickers on fixtures sold and make weekly reports to the city plumbing inspection bureau.

"This step has been taken," said Mr. Murray, "as a means of protection against the possible contamination of water coming from air-conditioning units using water. We now require that a master plumber make such installations and that water coming from the compressor and unit box be discharged over an open plumbing fixture."

At Last the Labor Agitators Get on the Right Track

WASHINGTON, D. C.—Even these times of strikes and general labor unrest hold their bright spots for the air-conditioning industry.

From Kansas City comes the news that a C.I.O. union being formed in a luggage factory is demanding a 20% wage increase, a 40-hour week —and air conditioning in the plant.

And, not to be left behind, the Retail Clerks union in Toledo is asking for air conditioning in stores which are organized by that branch of labor. Others may follow suit, labor observers believe.

REA Executive Estimates $25,000,000 Rural Sales

WASHINGTON, D. C.—Appliance sales for the 200,000 new rural electric customers forecast for 1937 should exceed $25,000,000, based on a conservative estimate of $125 a customer, says Foster Adams, chief of Rural Electrification Administration's research and statistics section.

A recent survey by the private utility industry resulted in an esti-

(*Concluded on Page 2, Column 4*)

Milwaukee Bureau Fights Misleading Advertising

MILWAUKEE—Following the lead of better business bureaus throughout the country, the Better Business bureau here has instigated a campaign to wipe out misleading and misrepresentative newspaper advertising by local appliance dealers.

Twelve professional shoppers are employed by the bureau to purchase

(*Concluded on Page 2, Column 4*)

Arch Black Joins Norge Export Division

DETROIT—Arch Black, veteran commercial refrigeration engineer, has joined Norge division of Borg-Warner Corp. as commercial engineer for the export division.

Before joining Norge, Mr. Black had been connected with Carrier International Corp.; Melchior, Armstrong, Dessau Co. (supplier of refrigeration parts doing a large business abroad); and Liquid Cooler Corp. (now Temprite Products Corp.).

More Contracts Indicated Under N.Y. Price Law

Report Several Companies Ready to Sign with Appliance Dealers

By W. H. Long

BROOKLYN, July 6—After four months of concerted action by members of the Electrical Appliance Dealers Association of Brooklyn, Inc. to establish price maintenance contracts with household refrigeration manufacturers under terms of New York state's Feld-Crawford Act, announcement of the signing of several such agreements with prominent manufacturers will shortly be forthcoming, officials of the dealers' association indicated today.

Although declining to name the companies with which they expected to reach agreements, association officers stated that Feld-Crawford contracts were being viewed favorably in several quarters, and, in a few cases, were awaiting only settlement of legal technicalities.

It was possible that one or more contracts between association members and manufacturers might be announced Wednesday night at a meeting of the Brooklyn groups executive committees, it was reported.

Representing 214 Brooklyn appliance dealers, who last year sold over $9,000,000 worth of electrical appliances including refrigerators, according to official figures of Brooklyn Edison Co., the association has steadily pushed for price agreements with all types of appliance manufacturers since early in March.

First success in obtaining cooperation from manufacturing branches of the electrical industry came in April when a washer company established price maintenance agreements with its dealer outlets who are members of the Brooklyn association.

Two weeks ago, when seven radio distributors signed contracts with their Brooklyn retailers, association officials announced that virtually all radio outlets in Brooklyn would henceforth operate under Feld-Crawford agreements.

Lines represented in the new price maintenance set-up are: Emerson, Grunow, Motorola, RCA-Victor, Sparton, Stromberg-Carlson, and Zenith.

A feature of the Feld-Crawford agreements with radio stores here is a schedule of fixed trade-in allowances.

Several Brooklyn dealers expressed satisfaction with these agreements, particularly the trade-in schedule, when interviewed this week.

Despite the willingness of radio manufacturers to enter into price maintenance agreements, however,

(*Concluded on Page 5, Column 1*)

Cleveland Dealer Group Reelects Grdina

CLEVELAND — Cleveland Retail Appliance Dealers' Association recently elected several new officers and voted to retain others for the second year of the group's existence.

Frank L. Grdina of Grdina & Sons was reelected president; Frank King of Newburgh Furniture Co. was retained as treasurer; and George W. Walker remains executive secretary of the association.

New vice president is A. L. Kaufman of C. L. Kaufman & Sons, who was elected to succeed W. E. Berndsen of Good Housekeeping Shop.

Besides Mr. Kaufman, new members of the executive committee are: William H. Buescher, Jr., The Buescher Co.; C. R. Davis, Davis & Moore, Inc.; S. Dempsey, Watkins Furniture Co.; and Frank J. Inch, Frank J. Inch Co.

F. Gleason Resigns Association Post To Join Brunner

DETROIT—Frank J. Gleason resigned July 1 as executive secretary of the Refrigeration Supplies and Parts Manufacturers Association, and of the Refrigeration Supply Jobbers Association to join the Brunner Mfg. Co. of Utica, N. Y.

Following a meeting of the directors of the Parts Manufacturers Association June 30 in Chicago, it was announced by President J. D. Colyer that R. M. McClure of the firm of McClure, Hadden & Swisher, association management engineers with offices at 111 W. Washington Blvd., Chicago, had been appointed to succeed Mr. Gleason.

On July 6 it was announced by R. H. Spangler, president of the Supply Jobbers Association, that the firm of McClure, Hadden & Swisher had been selected to take over the work formerly handled by Mr. Gleason.

Mr. Gleason returns to executive duties in the refrigeration manufacturing field after a two-year turn in association work, during which time he played a large part in making the new Parts Manufacturers and Supply Jobbers Association a potent factor in the refrigeration industry. Before going into association work Mr. Gleason had been connected with Universal Cooler Corp. for a number of years.

Indianapolis May Limit Use of Cooling Water

INDIANAPOLIS — Limited sewerage facilities in the downtown area may make necessary enactment of an ordinance limiting the amount of water which may be used in air-conditioning systems, according to Henry B. Steeg, city engineer.

The city works-sanitation department is making a survey of downtown air-conditioning facilities to determine whether or not such an ordinance is necessary. Mr. Steeg explained that sewers are at present overtaxed, and that a sudden downpour might cause damage in downtown basements unless existing conditions are remedied.

2,974 Refrigerators Sold In Florida Campaign

MIAMI, Fla.—A total of 2,974 electric refrigerators and more than 16,000 other appliances were sold in 13 weeks by the 64 dealers in this territory who cooperated with Florida Power & Light Co. in its "Better Living" campaign.

The utility does not merchandise refrigerators, but helped out dealers by commissioning 1,100 of its employes as "salesmen," with instructions to report names of all prospective customers whom they located. These names were then turned over to independent dealers. Utility employes were paid bonuses on all sales resulting from their leads.

Butler Heads Advertising For Carrier International

NEWARK—G. Vincent Butler has been appointed director of advertising and sales promotion for the international division of Carrier Corp., it was announced last week.

In this position, Mr. Butler will have charge of advertising, sales promotion, publicity, and the house organ for Carrier's export activities.

He came to Carrier in 1935 to handle publicity for the domestic division. Previously he had been with Copper & Brass Research association, where he had compiled confidential surveys on the uses of copper and its alloys in the fields of household and commercial refrigeration and air conditioning.

Labor Demands Shut Copeland Detroit Factory

Company Officials Blame Outside Influences for Unreasonable Requests

DETROIT, July 6—Copeland Refrigeration Corp.'s plant here was still closed today, six days after the management had shut down plant operations because of "unreasonable demands" on the part of the unionized plant workers. It was emphasized by company executives that "outside influences have been responsible for the continuous increasing of demands upon the management."

Officials of the company remained silent other than to deny a statement by Matthew Smith, secretary of the Mechanics' Educational Society, who said that the union had withdrawn its demands when the company stated that it was impossible to grant them.

Company officials denied the workers had withdrawn their demands and declared that the plant's closing was caused by the company's inability to meet the unreasonable demands made upon it by the employes.

Dallas E. Winslow, Inc., parent company of Copeland Refrigeration Corp., has a wide variety of industrial plant operations in all parts of the country, but there was no indication on the part of company officials that plans might be made to move manufacturing operations of Cope-

(*Concluded on Page 3, Column 1*)

New Seeger Cabinets Have Forced-Air Circulation

ST. PAUL—A new line of commercial refrigerator cabinets with forced-air circulation has just been placed on the market by Seeger Refrigerator Co.

The cabinets are equipped with a blower-type unit attached to the refrigerator's rear wall. Coil and cabinet form what is called a "synchronized combination," balanced so as to obtain proper temperature, air circulation, and humidity.

The blower unit itself has a one-piece galvaneal steel shell, finished in white Duco. The air inlet, consisting of a flue in the front of the cabinet, is covered with heavy galvanized wire mesh screen. Attached at the bottom is a stainless steel condensation pan.

Evaporator is of manifold construction, with tubing paralleled into common liquid and suction headers, providing wet expansion. Vertical

(*Concluded on Page 2, Column 5*)

Westinghouse Builds Under-Counter Unit

MANSFIELD — A new under-counter model refrigerator, especially designed to fit under standard-height kitchen counters, has been added to the Westinghouse 1937 refrigerator line.

Known as the UG-30, the new model measures 34½ inches high, 24 inches wide, and 24 inches deep. Designed and finished in white Dulux, it has all the features found in the larger Westinghouse refrigerators, including hermetically sealed compressor unit, dual-automatic controls, and Sanalloy evaporator.

Although only counter high, the refrigerator has a storage space of approximately 3 cu. ft. Its shelf area is 5.5 sq. ft., and its ice-making capacity 44 cubes or 4½ lbs. of ice, per freezing.

Accessories include two single-depth ice trays, a moonstone ware

(*Concluded on Page 3, Column 1*)

ASHVE Committee Lays Groundwork for Building Insulation Code

(Concluded from Page 1, Column 1)
summer meeting, special interest centered on the work of the Committee on Insulation under the chairmanship of L. A. Harding of Buffalo and the Committee on Comfort Air Conditioning under the chairmanship of Cyril Tasker of Toronto. Recent developments point to the necessity of more comprehensive information relating to the effect which conditioned air has upon building construction materials and the need for a review of insulation data made doubly important by the coming into use of glass building blocks and various newer types of insulation material.

The insulation committee laid the ground work at this meeting for the development of an insulation code and definite progress was reported with respect to studies of glass in building construction which will involve special research at the Society's laboratory in cooperation with the glass, window, and window appurtenance manufacturers.

It was apparent during the meeting that the society's current research activity is being directed broadly at determining:

(1) the physiological and psychological effects of air conditioning on people leading to a more complete understanding of how air conditioning affects the individual and how it may be improved to give the most beneficial results;

(2) what factors must be taken into consideration in order to apply air conditioning in the most economical manner consistent with highest standards of performance. In other words, as it is expressed, how to give the most service for the money which the public pays for air conditioning.

The technical papers delivered at the meeting strongly emphasized this trend. Equally divided between the fundamentals of equipment and performance and the ultimate result of air conditioning as it is experienced by the user, the discussion covered many forms of heating, ventilating and air conditioning, ranging from ventilation requirements and the science of air distribution, to the cooling and heating rates of a room with different types of steam radiators and convectors.

ODOR PROBLEM

Among the papers presented at this year's meeting were the following: "Ventilation Requirements" by C. P. Yaglou and W. N. Witheridge wherein was reported interesting facts regarding odors in a closed room. These findings will be reported in AIR CONDITIONING AND REFRIGERATION NEWS.

"Heating Requirements of an Office Building as Influenced by the Stack Effect" by F. C. Houghten, director of the A.S.H.V.E. research laboratory, and Carl Gutberlet. This study disclosed a considerable decrease in heat requirement with elevation in a building, indicating not only a complete absence of heat loss by infiltration in the upper floors, but also an actual decrease in the transmission loss due to the outflow of warm air through windows and walls.

A. P. Kratz, M. K. Fahnestock and E. L. Broderick of the University of Illinois, showed in another paper how considerable differences may exist between the cooling or heating rates of a room as influenced by different types of heating units.

John Everetts Jr., of New York in a paper on "The Adaptability of Pre-cooling Coils to Air Washer Systems," showed that the combination of pre-cooling coils and an air washer gives the accumulated advantages of each.

Importance of standard calculation methods to enable engineers to appraise the cooling load of a building was brought out by John James in a paper entitled "Cooling Load Analysis of a Bank Building."

ENERGY CONSUMPTION

Under the title "How Much Power Will an Air Conditioning System Use?" A. D. Marston of Kansas City, traced the relationship between outdoor weather conditions and the consumption of energy for operating the system.

Among other papers presented at the meeting were "Study of Summer Cooling in the Research Residence Using Water at Temperatures of 52° F. and 46° F." by A. P. Kratz, S. Konzo and E. L. Broderick; "Corrosion Studies in Steam Heating Systems," by R. R. Seeber and Margaret R. Holley; "Performance of Fin-tube Units for Air Cooling and Dehumidifying," by G. L. Tuve and C. A. McKeeman; "Calculated Overall Coefficients for Walls with Air Space Insulation," by F. B. Rowley; "An Alternate Method of Comparing Dust Arrestance of Air Cleaning Devices," by Arthur Nutting, Louisville, Ky.; and "Radiation and Convection Across Air Spaces in Frame Construction," by Gordon B. Wilkes and Carl M. F. Peterson.

The last-named paper brought out the interesting statement that current factors in use for estimating heat flow across inclosed air spaces result in errors of 300 to 400%.

College Air Conditioning Courses Tabulated in Survey by Sylvester

(Concluded from Page 1, Column 1)
offered," he declared. "The catalogue lists 12 courses ranging from a study of the principles of thermodynamics to the study of heating, ventilating, and air-conditioning equipment for buildings. Three refrigeration and air-conditioning laboratories are available to students."

Among other schools which include air conditioning in the curriculum are: Armour Institute of Technology; Bucknell; California Institute of Technology; Catholic University; Columbia University; Cornell University; Drexel; Duke University; Harvard Graduate School of Engineering.

New York University; Northwestern University; Oregon State; Pennsylvania State College; Rensselaer Polytechnic Institute; Stanford University; University Extension Service of the Massachusetts Department of Education; Yale University; and the Universities of Illinois, Iowa, Kansas, Missouri, and Wisconsin.

Milwaukee Bureau to Check Advertising

(Concluded from Page 1, Column 2)
merchandise which is suspected of being falsely advertised. Articles purchased in this way are brought to the bureau's laboratory where experts determine whether or not misrepresentation has taken place in the advertising. More expensive articles are inspected by the bureau's experts who pose as customers in the store of the suspected dealer.

Investigation of misleading advertising practice here has shown that the small dealer is not the only offender, for even the larger department stores have frequently been guilty of misrepresentation, whether deliberate or unintentional. Sometimes this is the fault of the stores' buyers, who are not always too careful about the quality of merchandise they purchase.

Whenever misrepresentative advertising is discovered by the bureau's investigators, the offending store is requested to discontinue such practices, and in many cases purchasers are reimbursed or receive some sort of adjustment.

Adams Cites REA Record To Other Farm Areas

(Concluded from Page 1, Column 2)
mated average figure of $141, he pointed out.

"There is no ultimate answer as to how much equipment the farmer can use on these rural lines with benefit to himself and his family," Mr. Adams said. "New appliances are being invented for new uses of electricity, and improved appliances are being developed to provide improved performance in doing old tasks.

"There are farms in many parts of the country which use from $500 to $2,500 worth of electrical appliances and equipment—but some of these are show places, and cannot be considered typical."

To indicate what can be done in appliance selling in a comparatively short time, Mr. Adams cited the following figures covering four REA projects in three southern states during the first five to 10 months of their operation:

* * *

	Per Cent Farms	Per Cent Saturation, April 1, 1937 Refrig.	Range	Water Heater
Monroe county, Miss.	79	47	7	1
Meigs county, Tenn.	88	24	9	3
Duck River, Tenn.	100	23	11	2
Cullman county, Ala.	100	18	3	1

Four Models in New Seeger Cabinet Line

(Concluded from Page 1, Column 5)
fins are used, and are continuous from tube to tube. All evaporator joints are silver soldered. A heat interchanger, located above the motor and fan assembly, materially increases the efficiency of the system.

In operation, air is drawn through the front circular opening by means of a fan, and passes through the cooling unit, which lowers its temperature, washes it, and removes excess moisture. The air is then forced out the bottom opening.

Four models are in the new Seeger line, two of them of the self-contained type and one of these with an ice-making cooling coil of the dry-expansion type.

This smallest model, P-22, has a shelf area, including the bottom, of 36.56 sq. ft., and a net storage capacity of 22 cu. ft. Finish is porcelain inside and out, with space for the compressor in the base of the cabinet. Ice freezing capacity of the unit's eight trays is 208 cubes or 25½ lbs. per freezing.

Model AC-32, next in the line, has a shelf area of 45.06 sq. ft. and net food storage capacity of 32.55 cu. ft.

Model AC-40 has a shelf area of 61.97 sq. ft. and food storage capacity of 41.9 cu. ft., while the AC-64 has a shelf area of 89.1 sq. ft. and food storage capacity of 64.1 sq. ft.

All models are all-porcelain, with heavy brass chrome finished hardware, tinned shelves of the wire bar type, automatic electric light switch on all doors, adjustable shelf standards, bakelite breaker strips, and balloon type rubber gaskets.

A meat hook rail location is provided on all models, and is available at additional cost. Insulation on all models is 3 inches in walls and doors. Legs are 6 inches high, for ease in cleaning beneath the refrigerators.

For average conditions, it is recommended that a ⅓-hp. compressor be used with P-22 and AC-64 units, and a ¼-hp. unit with the AC-32 and AC-40 models. As produced at the factory, the cabinets are complete and ready for installation except for the compressor, the tubing, and the expansion valve, all of which are furnished by the installer.

GET THE SALES CLOSING ADVANTAGE OF

Flexible Rubber Trays

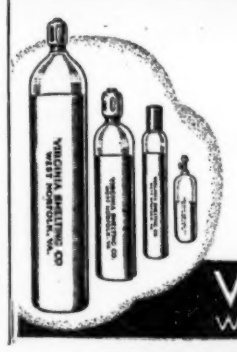
Today's refrigerator buyers expect to get ice cubes instantly—*at* the refrigerator . . . full-sized, cold and dry . . . one or a dozen . . . without tugging or pulling. And the *only* way to get them *at* the refrigerator . . . *as* they are needed . . . is with Flexible Rubber Trays. So reduce sales resistance by offering your prospective purchasers insurance against wasteful, woeful, faucet-flooded "sink-sissy" cubes. Give your salesmen the advantage of the sales-closing feature of Flexible Rubber Trays. Get the benefit of Inland's national advertising. Insist that the refrigerator you sell comes factory equipped with Flexible Rubber Trays.

* * *

INLAND MANUFACTURING DIVISION
General Motors Corporation Dayton, Ohio

ICE CUBES INSTANTLY—AT THE REFRIGERATOR

Automatic refrigeration relieves a woman of a thousand cares, worries, annoyances—and needless jobs that wore her mother into wrinkled age.



EXTRA DRY ESOTOO and V-METH-L relieve the manufacturers and the service engineer of all worry as to the quality of the refrigerant necessary for satisfactory operation of their refrigeration units. They know EXTRA DRY ESOTOO and V-METH-L are pure, dry, and available for immediate delivery.

VIRGINIA SMELTING CO.
WEST NORFOLK VIRGINIA

Workers' Demands Cause Closing of Copeland's Plant

(*Concluded from Page 1, Column 5*)

land refrigeration equipment elsewhere.

Copeland had labor trouble twice earlier this year—a sitdown strike that lasted an hour, followed by a walkout that shut down production for five days. An agreement made at that time expired July 1. It was during the negotiations for a new agreement that the union officials made demands which forced the plant closing.

At the time the plant was shut down on June 30 Dallas E. Winslow, president of Copeland Refrigeration Corp., issued the following statement:

"Over a period of several years Copeland Refrigeration Corp. has endeavored to deal fairly with employes and grant them every request within reason. This fact is attested to by the large number of employes who have been with the corporation over a period of several years.

"Within the past few months disturbances have arisen that materially affect operating efficiency as well as the friendly relationship that has existed between employes and the management over a long period of time.

"The same outside influences who have been responsible for this change in condition have also been responsible for the continued increasing of demands upon the management to a point where continuance of operation is impossible.

"Copeland is always willing to bargain with employes or their representatives, but recently demands have been so unreasonable that it has been deemed advisable to close the Detroit plant.

"This action is taken after the company recently experienced a general strike that completely closed production, preceded by a sitdown strike."

'Under-the-Counter' Unit Makes Its Bow

(*Concluded from Page 1, Column 5*)

chilling tray, two improved-type shelves, and a third shelf with a bottle well. Interior of the cabinet is of one-piece porcelain, with rounded corners for easy cleaning. The unit also has an automatic interior light.

The UG-30 model refrigerator is particularly adaptable to the planned kitchen designs for apartment house kitchens. Novel application in the new efficiency type kitchens is combined in a unit with the sink basin, work surfaces, lower storage drawers, and wall cabinets.

The unit can be installed in any location in the kitchen, however, and its top adds additional work surface space. Black recessed pedestal space permits a natural position while working in front on the refrigerator.

Gray Replaces Markland In Miami Distributorship

MIAMI, Fla.—H. E. Markland has resigned his position as executive vice president and sales manager of Major Appliances, Inc., according to announcement by W. D. Rowlands, president of the company.

George Gray, Jacksonville, Fla., district sales manager for Leonard Refrigerator Co. for the past several years, and previous to that a Kelvinator distributor in the Middle West, will assume the duties vacated by Mr. Markland as general sales manager of the corporation.

Mr. Rowland has purchased Mr. Markland's stock and interest in the company.

BRUNNER
Send for the New
REFRIGERATION CATALOG
Seven Models of Compressors
Fifty-eight Models of High-sides from ¼ H. P. to 15 H. P.
BRUNNER MANUFACTURING CO.
UTICA, N. Y.

Additions to G-E Promotion Staff Are Announced

CLEVELAND — Several personnel changes and additions in the advertising and sales promotion section of the specialty appliance sales division of General Electric Co.'s appliance and merchandise department have been announced by A. L. Scaife, section manager.

Contact men have been appointed to work in the advertising and sales promotion section as representatives of the various appliance sales sections. These men and the sections they represent are:

F. W. Chandler, domestic refrigeration; J. F. McBride, range and water heater; F. J. Geib, dishwasher, disposall, and unit kitchen.

Lawrence W. O'Brien, formerly with Toledo News-Bee, Associated Press, and Niles Daily Times, has joined the staff of On The Top, G-E house organ edited by Carle Robbins.

Mr. Chandler formerly was dealer division manager for General Electric, and has been connected with refrigeration sales for 10 years. Mr. McBride was transferred to his new position from the company's Schenectady office, where he had worked in the publicity department handling advertising and sales promotion on transformers since 1932.

Mr. Geib was formerly employed as an artist, layout man, and associate editor of On The Top.

Cutler-Hammer Official Joins Lord & Thomas

MILWAUKEE — Forrest U. Webster has resigned as merchandising sales manager of Cutler-Hammer, Inc., manufacturer of refrigeration and air-conditioning switches and controls, to join the staff of Lord & Thomas, New York advertising agency.

Mr. Webster had held his recent position for three years, after having spent nine years as Cutler-Hammer's advertising manager.

He is chairman of the advertising and publicity committee of National Electrical Manufacturers Association, and a member of that association's committees on adequate wiring promotion and business development.

Hoy to Distribute Gibson In Albany-Troy Area

ALBANY, N. Y.—Hoy & Co., Inc. has been appointed distributor of Gibson refrigerators in the Albany-Troy area, according to F. E. Basler, general sales manager of Gibson Electric Refrigerator Corp.

9-Man Board to Guide Detroit Dealer Group

DETROIT — Appointment of a nine-man board of directors to temporarily guide the activities of Detroit Appliance Dealers' Association until a more permanent organization can be effected has been announced by Carl Lass, executive secretary of the association.

Mr. Lass also announced that 71 dealers, including all downtown outlets, are now members of the association.

Members of the board of directors are: Colin Campbell, Campbell-Penfield Co., chairman; E. C. White, Gardner White Co., treasurer; R. Richards, Nome Refrigerator & Appliance Co.; E. J. Ludwig, Detroit Household Equipment Co.; Lloyd Moon, Moon Bros., Inc.; Frank Washburn, Washburn & Farwell; Jack Lewis, Wagner Electric Co.; Bernard Lasky, Lasky Furniture Co.; Carl Kunert, Wellensiek Music House.

H. Czech Heads Milwaukee Electrical League

MILWAUKEE — Henry Czech, of Westinghouse Electric Supply Co., has been elected president of Milwaukee Electrical League.

Delavan Quits Penn to Form Own Firm

DES MOINES, Iowa—Nelson B. Delavan has announced his resignation as vice president and director of sales of Penn Electric Switch Co., and his plans to form the Delavan Engineering Co. here in partnership with R. Douglas Marshall and Randall A. Smith, former Penn employes.

Mr. Delavan explained that his decision was prompted by Penn's move to Goshen, Ind.

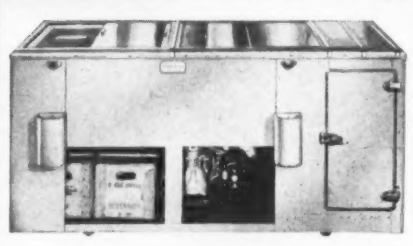
Delavan Engineering Co. will offer sales and engineering service to manufacturers of controls, valves, gauges, instruments, motors, and other accessories and specialties in the refrigeration, heating, air conditioning, and allied fields.

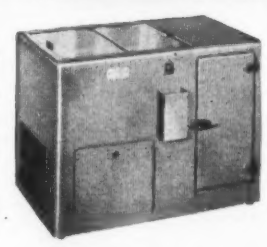
Arrangements have been made, Mr. Delavan asserts, to act as factory engineering sales representatives for a few companies in Iowa, Kansas, Missouri, Minnesota, Nebraska, North Dakota, and South

Before his seven-year association with Penn as sales manager, vice president, and sales director, Mr. Delavan spent nine years as assistant to the general manager and merchandising manager of Gould Pumps, Inc.

Mr. Marshall was Penn's western sales manager for about three years, while Mr. Smith handled sales engineering.

Now Brunswick OFFERS YOU
EXCLUSIVE DEALERSHIP
ON THE 3 PURPOSE
BLUE-FLASH
Beverage Cooler


Model D—The SUPER BLUE FLASH


Model B—The BLUE FLASH

For the first time in history, the Brunswick-Balke-Collender Company offers you an *exclusive dealership* on the fastest-selling Bottled Beverage Cooler on the market—the famous *Blue Flash!*

- NO STOCK TO CARRY!
- ATTRACTIVE DISCOUNTS!
- IMMEDIATE DELIVERIES!

Get all the facts about this Blue Flash Dealership. Territories will be closed rapidly! Learn how you can add this splendid new source of profits to your present line. Find out how you can get these extra profits without making a big investment—without having to carry a large stock. See for yourself how Bottled Beverage retailers everywhere enthuse over the bottled beverage *profits* that this merchandising cooler brings them. Learn all about the exclusive Brunswick Retail Merchandising Plan, as well as the many fine engineering features that make this 3 purpose cooler the finest that money can buy! There's a coupon below for your convenience.

BLUE FLASH LEADS ALL COOLERS IN SALES

1936 Volume Now Tripled

This year Blue Flash Sales are skyrocketing! Already, sales are *three times as great* as they were in 1936! The marked swing to Blue Flash is in progress. This famous "Merchandising Cooler" shows greater sales increase than any other.

4000 Units Sold in One Territory!

In *one territory alone*, over 4000 units were purchased by customers who sell bottled beverages. The market is tremendous. The opportunity for reputable Dealers is great.

- Sold under easy Monthly Terms or Meter Payment Plan!
- No Down Payment!
- Pays Its Own Way in Extra Beverage Profits
- Retail Merchandising Program Builds Customers!

In addition to offering your prospects an all-purpose, wet and dry Cooler and Refrigerator, on which you can guarantee *immediate delivery* you can also offer them easy monthly terms *meter payment plan*. Free tested Merchandising and Advertising program builds sales and makes it easy for your customer to pay for the cooler out of actual *extra profits*.

Send this Coupon

GET THE FULL BENEFITS AT ONCE

THE BRUNSWICK-BALKE-COLLENDER COMPANY
Appliance Division A1.
625 South Wabash Avenue, Chicago, Illinois.

Gentlemen:
Send me full details of your Exclusive Dealership on Blue Flash Bottled Beverage Coolers immediately. I am attaching my business letterhead. It is understood, of course, that this request for information does not obligate me in any way.

Name.....
Address.....
Town.....*State*.....

The BRUNSWICK-BALKE-COLLENDER CO.
Established 1845
625 S. WABASH AVENUE • APPLIANCE DIVISION • CHICAGO, ILLINOIS

FEMALE FLARE UNION
REDUCING NUT
S. A. E. FLARE TO MALE PIPE ELBOW
STRAINER CONNECTOR
STRAINER CONNECTOR
S. A. E. DOUBLE FLARE TUBE ELBOW
FROST-PROOF NUT
S. A. E. DOUBLE END FLARED UNION
STRAINER CONNECTOR
SWIVEL S. A. E. MULTIPLE VALVE UNION
S. A. E. THREE-WAY FLARE TEE
CROSS
FEMALE FLARE TO MALE FLARE REDUCER
S. A. E. FLARE TO FEMALE PIPE ELBOW
FEMALE FLARE TO MALE PIPE CONNECTOR
FLANGE PAD ADAPTER
SIGHT GLASS INDICATOR AND LINE FILTER
LINE STRAINER

Chicago Association Makes Playlets & Demonstrations Do Appliance Selling, Omitting All Direct Solicitation

CHICAGO—Absence of solicitation, either during or after performances, marks the promotional playlets and demonstrations presented each year in the auditorium of Chicago Lighting Institute by the women's division of Electric Association of Chicago in an attempt to familiarize women with electrical service and electrical appliances, reports Hazel Brown, secretary of the division.

Appliances and equipment made by manufacturer members of the association are used at various times throughout the season and questions are answered regarding the various articles, but it is left to the housewife herself to visualize in terms of her own housekeeping the usefulness of whatever is being demonstrated. Prospective customers are always referred to their own dealers.

Performers and frequently authors of these playlets are members of the women's division. Tea is served at each performance.

One of the playlets in the 1936-37 series was entitled "Let There Be Outlets," and showed the difficulty encountered by a young couple in arranging the furniture in their new apartment because of the scarcity and inconvenient location of electric outlets.

Some of the programs planned for the coming season follow:

"De-Light in Living," scheduled for presentation next fall, is built around home modernization and the attractiveness and practicality of modern lighting; "Xmas Lites for Frosty Nites" will demonstrate simple, effective Christmas decorations which can be made at home; "Enchanted Housekeeping" will start off the 1938 portion of the season with a portrayal of the cooking trials of a young bride, and the solution of her problems through use of electrical appliances; "The Magic of a Lighted Garden," the program scheduled for next April, will emphasize the charm and beauty of garden lighting.

Proof of Trouble Free Service Found by Alabama Utility

BIRMINGHAM, Ala.—Proof that electrical appliances give trouble-free service was amply furnished the Alabama Power Co. recently. The company asked 85,000 residential customers to avail themselves of the free services of its home economics department if any of them felt they weren't getting satisfactory service from their electrical equipment.

Of the 145 customers who responded, only 11 reported difficulty with the operation of their appliances. The other 134 merely wanted instruction in the proper use of them.

It is estimated that the company has 20,000 electric ranges, 50,000 electric refrigerators, and thousands of other appliances on its lines.

Specify ANSUL REFRIGERANTS

high Quality ..... better Performance

Complete refrigeration satisfaction depends to a large degree upon the quality and performance of the refrigerants used. If you will specify ANSUL SULPHUR DIOXIDE and ANSUL METHYL CHLORIDE your satisfaction is guaranteed. Every cylinder is given an individual analysis to make certain that the contents are perfect for refrigeration purposes. Write today for complete specifications, prices and the location of the warehouse nearest you.

ANSUL CHEMICAL COMPANY
MARINETTE WISCONSIN

FUMES-GAS

such as Sulphur Dioxide—do not belong in a man's lungs. What if they are "light," or the exposure sustained is short. How about the effect of a lot of little doses? Anyway, it is wiser to be protected. Equip for this hazard with

CESCO HEALTHGUARD FUME KIT

It is light and compact. No trouble to take along. Goes on in a jiffy—comes off the same way. Fits the face perfectly—doesn't bind or bother. In the midst of fumes, gases or mists, allows a man to breathe pure air—work in comfort and security.

WRITE FOR DETAILS

Kit comes equipped with cartridges for gases commonly encountered in refrigeration . . . Ammonia, Sulphur Dioxide and Methyl Chloride. Cartridges for other gases available.

CHICAGO EYE SHIELD CO.
2352 Warren Blvd. CHICAGO, ILLINOIS

Kitchen Plan Proves to Be Good Salesman In Portland

PORTLAND, Ore.—The 56 kitchen plans prepared for architects and builders and the 139 kitchen plans prepared for kitchen modernization prospects by Portland General Electric Co. during August, September, and October, 1936, have since resulted in the sale of 231 major appliances—118 ranges, 25 refrigerators, 80 water heaters, and eight dishwashers.

Within 60 days of the completion of the three-month period, 62 plans were responsible for the sale of one major appliance, 51 plans sold two appliances, and 21 plans sold three. Only four of the plans were productive.

Layouts for the plans were prepared according to the latest principles of kitchen economy and efficiency, but no structural detail was shown. Complete layouts and colored perspective views of the proposed kitchens were furnished to prospects.

Utility Tests Ice-Cost Payment Plan

DANBURY, Conn.—Danbury & Bethel Gas & Electric Light Co., a Cities Service affiliate frequently used for testing appliance merchandising ideas, has made available to persons residing on its power lines a payment plan for Frigidaire and General Electric refrigerators which apparently is based on the daily cost of ice.

Announcements of the new plan read: "Electric refrigeration for your present refrigeration cost." Purchasers make weekly or monthly payments with "refrigeration tickets" computed at the rate of from 6 to 14 cents per day.

New Dealer's Kitchen Planners To Stress Apartment Sales

HARTFORD, Conn.—William A. Mauser and D. A. Battistini have formed Wildan Electric Co. here to handle Universal, Hotpoint, and Frigidaire electric refrigeration equipment and other major appliances.

A kitchen-planning service has been inaugurated by the firm, which plans to stress quantity appliance sales to apartment-house owners.

Florence, Ala. Dealers Favor Exclusive Line Policy

FLORENCE, Ala.—Handling one manufacturer's household appliances exclusively is the best business policy, in the opinion of three local specialty appliance dealers.

O. B. Brazil, co-manager of the Motor Supply Co., Norge dealership, says that by giving the one company all his business he finds that he can get more cooperation from that firm in the way of advertising and other sales promotion projects. Concrete proof of the soundness of Mr. Brazil's belief is the fact that he is selling an average of 300 refrigerators a year with a negligible number of repossessions.

"Give me one good line and the exclusive representation therefor, and I will not worry about building up a business," says John Hauerwas, manager of the Hauerwas Electric Co., handling General Electric products. Mr. Hauerwas has discovered that customers who buy one type of appliance from him return to buy other types, and their names remain on his books almost continuously.

Similar results are reported by A. C. Wade, proprietor of the Wade Electric Co., Westinghouse dealer.

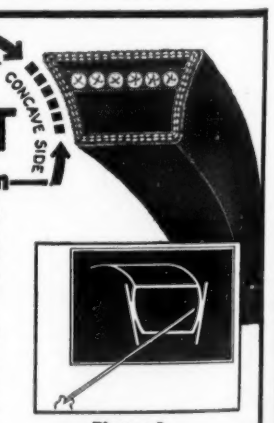
"I like to know," says Mr. Wade, "that in building up preference for one manufacturer's product, I am building repeat business for myself. We find that customers who purchased refrigerators and radios from us and liked them are coming back now to buy ranges, water heaters, and other appliances. They are sold on our line from actual experience, so that additional business comes automatically to us."

50 Architects, Builders Attend Kelvin Home Luncheon

NEWARK—More than 50 architects, builders, and others interested in the Kelvin Home program in this territory met at a luncheon sponsored June 8 in Robert Treat hotel by Krich-Radisco Co., Nash-Kelvinator distributor.

Leslie G. Estep, director of Nash-Kelvinator's Kelvin Home division, presented the results of a two-year national survey made to determine the needs and desires of prospective homeowners. B. Gordon Krich, manager of the distributor's commercial division, presided.

This Simple patent is the secret that has made a SILENT V-BELT . . . . and here's the reason



When a straight-sided V-belt bends around its pulley there is tension on the top of the belt and compression on the bottom. This makes the side walls bulge outward—as shown in figure 1, below.

The Gates Belt is built with a patented concave side. The bulge, due to bending, simply straightens the concave side to a precise fit with the sheave groove as shown in figure 2.

This exact fit naturally prevents slipping. No slipping means a SILENT belt, a belt that wears longer, a belt that does not heat and therefore does not stretch.

BELT GUIDE — FREE

The Gates Belt Guide is the recognized national authority on correct belt fit for ALL Refrigerators, Washing Machines, Pumps, Stokers, etc., etc. FREE from your Jobber or the GATES RUBBER CO., Denver, Colorado.

Write Today!

Figure 1

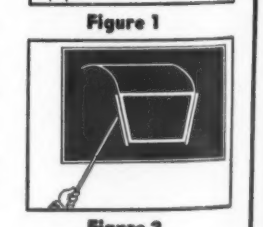


Figure 2.

GATES BELTS

WEATHERHEAD

STOCKED by leading jobbers everywhere, Weatherhead valves and fittings include all necessary and essential parts for refrigeration installations. Whatever you want will be found in the new refrigeration catalog. Have you got your copy?

300 EAST 131st STREET

Brooklyn Dealer Group Puts Next Move to Stop Price Cutting Up to Manufacturers

(Concluded from Page 1, Column 3)

association officials report that hitherto no definite commitments could be obtained from household refrigeration manufacturers, although several expressed approval of the movement.

Uncertainty as to how Feld-Crawford compliance would affect sales is viewed by Russell A. Atkinson, president of the dealers' group, as the reason for hesitation on the part of manufacturers in accepting the association's invitation to sign price agreements with Brooklyn dealers.

Preparatory to seeking price contracts with manufacturers, the association drew up its code of fair trade practices which secured approval from 172 of 185 members attending a meeting on April 28.

CODE PROVISIONS

Provisions of this code were as follows:

"1. The dealer agrees to sell at prices set by the manufacturer or distributor.

"2. The dealer agrees not to give any bonus, credit or premium stamps, presents or kickback of any description in connection with the sale of merchandise under provisions of the Feld-Crawford Act.

"3. To sell under the Feld-Crawford Act separately and not in combination of merchandise.

"4. The dealers to give only a reasonable and proper trade-in allowance which in no event shall exceed the amount stipulated by the manufacturer.

"5. The dealer agrees not to transship or to sell to any other dealer in the State of New York except at the full cash selling prices as set by the manufacturer or distributor of merchandise, protected by Feld-Crawford contracts.

"6. To cooperate with the manufacturer or distributor of trade-marked or branded merchandise in adjusting any complaints in an amicable manner.

"7. Dealer agrees to cooperate with the manufacturer or distributor in the sale of trade-marked or branded articles.

"8. The dealer will not offer in any manner to any person merchandise not covered by the Feld-Crawford contracts at less than the cash selling prices.

"9. The dealer agrees to fully cooperate with the Fair Trade Act Committee of this association and to submit to arbitration any complaint made in connection with any violation of fair trade practice.

"10. The dealer approves and agrees to the shopping service of the association and if found guilty of violating any of the provisions of the Feld-Crawford contract, consents to his expulsion from membership in the association, and further consents that the association may incur the expense, in enforcing the claims of any member injured by reason of any violation of Feld-Crawford contracts."

Copies of the code resolution were sent to all household refrigeration manufacturers having Brooklyn retail outlets, to makers of other appliance lines sold in the borough, and to all members of the association by registered mail, according to Albert H. Bernhard, secretary.

COOPERATION ASKED

Prior to the formulation of this code, the Brooklyn association voted unanimously at its March meeting to "call upon and request all manufacturers and distributors, selling to and through us, trade-marked, branded, or named commodities, that they forthwith enter into contracts maintaining a fair and stipulated price; and that we hereby pledge our consent and acceptance of such contracts carrying out the spirit and purpose of the said (Feld-Crawford) law."

In addressing copies of the code and this resolution to manufacturers, the association included a letter signed by Martin A. Tarzian, chairman of the board of directors, and Russell A. Atkinson, president, which said in part:

"It is our belief that a one price selling policy must raise the standard of retail selling. Price maintenance instills confidence in a product and dealer—it also produces a more staple basis for business. Price cutting is unfair competition. It does not protect the goodwill of the manufacturer's product.

"Our dealers are sincere in cooperating in any movement for Fair Trade Practice and resale price maintenance. The contents of the Resolution is the personal code for each member of our Association and each has received a printed copy for his guidance hereafter, by registered mail.

"Now is the time for sincere and constructive manufacturers or distributors to adopt the benefits of the Feld-Crawford Act. The dealers are ready to give full cooperation. Do not let a very small minority scare you into the belief that contracts under this law cannot be enforced. They can, and if you really want your product sold at the prices you have set, here is the opportunity."

INTEREST WIDESPREAD

So widespread has been the interest of other dealers' associations throughout the country in the efforts of the Brooklyn group to secure Feld-Crawford contracts, says President Atkinson, that several have requested copies of the association's own code and its letter to manufacturers.

Latest of these, says Secretary Bernhard, is the Appliance Dealers Protective Association of Oakland, Calif., which is endeavoring to establish price maintenance contracts. Others in Indianapolis and upstate New York have also asked for the Brooklyn association's aid.

President Atkinson, member of the firm of R. J. Atkinson, Inc., a Frigidaire outlet, and Martin A. Tarzian, of Tarzian Bros., another Frigidaire store, have led the fight of the association for price maintenance and established resale allowances ever since concerted action was first taken in March.

"We had a series of six meetings with representatives of companies manufacturing ranges, home laundry equipment, household refrigeration, vacuum cleaners, radios, and small appliances, during which we discussed with them the need for Feld-Crawford contracts," President Atkinson stated.

"Chaotic price conditions in the metropolitan area prompted these meetings, and we felt that if we obtained contracts from the manufacturing branches of the industry both they and the individual dealer, not to mention the buying public, would benefit appreciably.

"When the radio contracts were announced," he continued, "some of the opponents of the Feld-Crawford law and its objectives said that establishing list prices again would result in lowered sales. Exactly the opposite has been the case—radio sales are on the upgrade here in Brooklyn.

"And the consumer has gotten the break because prices on 1937 lines have actually been below the 1936 level under Feld-Crawford Act contracts," Mr. Atkinson added. "I know of one model in a well-known line which sold for $89.50 last year, and this year it is selling in the same size for $72.50. That ought to convince people that price maintenance doesn't necessarily mean higher prices."

MAKERS' HELP NEEDED

In the case of household refrigeration contracts, President Atkinson declared that his association has taken the lead and has done all it can to cooperate with the manufacturers, and that the next move is now up to them. Price cutting will never stop, he believes, until manufacturers join in the movement.

"Manufacturers who use Feld-Crawford contracts with their dealers will find them a big advantage," he continued. "They won't have so many worries about making sales quotas because the business will be placed on an honest basis, trade-marks will be protected, and I believe prices can actually be reduced when sales are made on a selling price basis because discounts will begin from list."

Noting the nation-wide movement toward price maintenance contracts in the electrical industry, Mr. Atkinson pointed out that 39 states now have some form of these agreements approved by law.

Need for price maintenance in Brooklyn was cited by another dealer who declared that it was a common practice for retail customers to purchase a refrigerator from apartment house contractors at 10% or more below the retail dealer's wholesale price from the distributor, thus making it impossible for the average retail outlet to sell against such cut-price competition.

Such practices, Brooklyn association officials feel, will be permanently ousted if refrigeration manufacturers will lend the weight of their signatures to price maintenance contracts.

Martin A. Tarzian, chairman of the association's board of directors, who feels very strongly on the subject of manufacturers meeting the dealers half way on Feld-Crawford contracts, compared the situation to a baseball diamond on which the association has gotten only to first base with the greater majority of manufacturers.

"The manufacturers' reluctance to protect their trade-marked merchandise proves only one thing to me—that they have a definite lack of interest in such merchandise after they get the full price from the retailer," declared Mr. Tarzian.

"Evidently some manufacturers don't care what merchandise sells for to the consumer, but the dealer, who has to take the loss in cut-price competition, does. Thereby, the manufacturer isn't helping to keep standards in selling that he maintains in the processes of manufacture.

"Too many manufacturers—in refrigeration as well as other appliance lines—lay all the ills of the business at the door of the dealer," Mr. Tarzian continued. "Yet when an association of 200 or more dealers like ours takes the initiative, cooperation is lacking in most quarters. We have done our part—what is the industry's answer?"

Mr. Tarzian feels, however, that within a few days several manufacturers of household refrigeration lines will enter into Feld-Crawford contracts with their distributors and dealers. The same view was taken by Albert H. Bernhard, secretary of the Brooklyn group.

Several prominent dealers located in Brooklyn, when asked their opinions of the situation by the writer, concurred in predicting that price maintenance agreements are not far off.

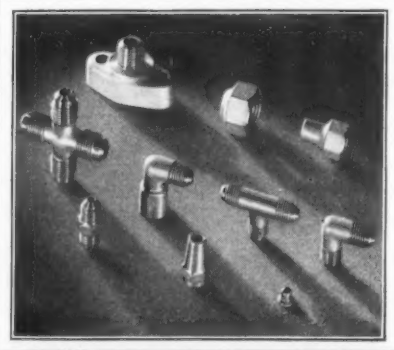
"When they come," one dealer declared, "you can be sure that price-cutting and gyp dealers will be gone from Brooklyn. We're united on the subject now, and my only hope is that the manufacturers will cooperate with us."

Don Keller Heads Sales For Moser & Suor

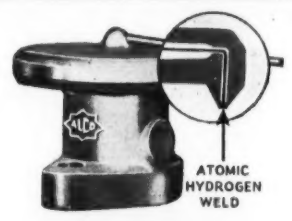
KANSAS CITY, Mo.—Don G. Keller, who for the past year and a half has been appliance sales manager for General Electric Supply Co. here, has been appointed sales manager of Moser & Suor, Norge distributor in this territory.

In his new capacity Mr. Keller will relieve Joe G. Suor, president of the distributorship, of some of the duties of active management.

Mr. Keller has also been associated with Glueck & Co., local appliance outlet.



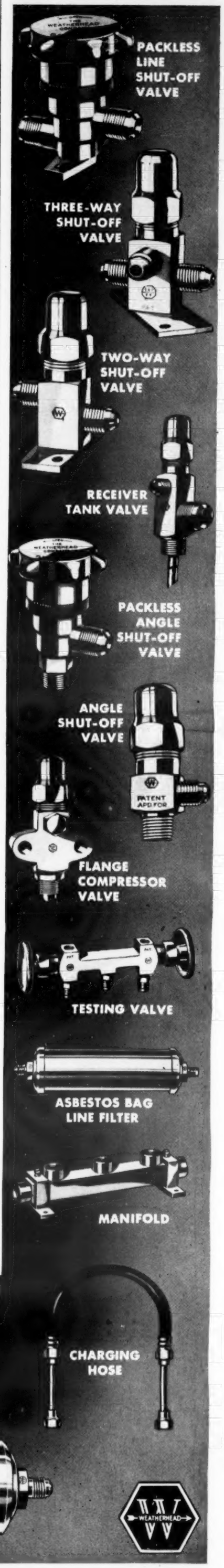
PERFECTION
Refrigeration Fittings
are *Certified to Excel*
•
Ask for catalog covering complete line of Fittings, Valves, and Compressor Parts
PERFECTION REFRIGERATION PARTS CO.
HARVEY; ILLINOIS



ALCO ENGINEERED

ALCO'S ATOMIC HYDROGEN WELDED POWER ASSEMBLY GIVES LONGER VALVE LIFE

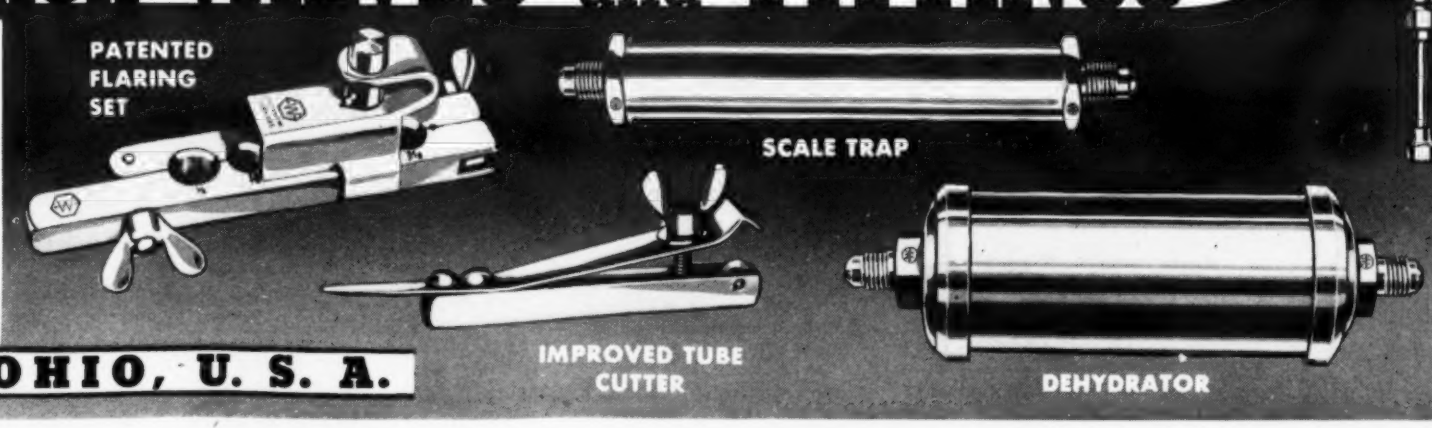
ALCO VALVE CO., INC.
2620 Big Bend Blvd.
St. Louis, Mo.



Refrigeration VALVES and FITTINGS

WEATHERHEAD valves and fittings are of the highest quality. Acceptance of them as original equipment by leading manufacturers the world over is proof of their superior design and utility. If you need a special valve or fitting, send us the specifications. Weatherhead parts are always better.

CLEVELAND, OHIO, U. S. A.



SPECIALTY SELLING IDEAS

Keeping Old Customers Satisfied Is Just as Important as Looking for New Prospects, Tacoma, Wash. Dealer Maintains

TACOMA, Wash.—It is just as important to pay attention to old customers as to look for new ones, believes Sterling Cox, head of the radio and refrigeration section of Rhodes Bros. department store.

Says Mr. Cox, "A refrigerator is not really sold unless the customer is satisfied with it, until it makes more sales for us. Prospects are important, of course, but they are never more important than old customers, set on repeat."

Pay-attention methods include calling on all old refrigerator customers twice a year and checking up on service calls.

One of the semi-yearly calls is made in cold weather, the other in warm. General procedure is simply to knock at the door and ask:

"How are you enjoying your refrigerator these hot (cold) days? Is there any way that we can be of service?"

Results of this method, says Mr. Cox, are threefold:

1. Friendly relations are cemented between customers and store. Customers are pleased to feel that the store is interested in them.

2. Operation difficulties that may be making dissatisfied appliance owners can be detected and corrected.

3. New prospects are uncovered during the calls.

Complaint secured on one such call was to the effect that the customer was sorry she had not purchased a larger refrigerator. This testimony, says Mr. Cox, has been used by his sales force to sell larger-size units ever since.

During the past year, $177 was the average sales price of each new model sold.

Attaching much importance to service calls, Mr. Cox makes it a point to go himself if the same customer complains more than once on the same item. Nor does he conclude that a customer is just a crank when persistent and repeated calls come in from her.

Usually, he says, such a customer does not know how to use her refrigerator properly, and she needs advice, not service.

The Rhodes store divides its appliance department into two sections. Radios and refrigerators are segregated in one department under one buyer, and washers, ironers, and ranges are put in another department under another buyer. Such division of effort, it is claimed, provides for greater merchandising emphasis on all major appliances.

How Appliance Dealers Can Work Together To Increase Sales Told by Weston

KANSAS CITY, Mo.—Suggestions as to how electric appliance dealers might work together for increased sales and profits were recently made by George W. Weston, secretary-manager of the Electric and Radio Association of Kansas City, in an address before dealers in another city.

Mr. Weston's suggestions were based on practices of the Kansas City association, now in its fourth year of successful operation, and are interesting because of the widespread interest in fair trade practices current among dealers in many cities.

A recent check showed the Kansas City code to be operating about 95%, much of the credit for which Mr. Weston gives to the leadership of Gordon Buck of Household Utilities Corp., and his assistant, L. H. Carr of Great Western Stove Co.

Mr. Weston's outline of suggested practices for dealer associations follows:

"Find one or two Gordon Bucks and L. H. Carrs, then back them up. Some one or two men must run the organization. Most every organization is run by a few men.

"Mimeograph your code and get it in the hands of all dealers. Start easy—don't attempt too much at outset.

"Have a printed 'blue book' folder and keep each salesman supplied with a copy.

"A shopping service is fine, if you can arrange it some way.

"Don't 'pan' dealers in open meetings—if your group is small, discuss violations and reports seriously, but constructively.

"Don't be afraid to lose a sale. Your net profits will be better each month, although your volume in units may be a trifle less.

"Remember, nothing of this kind functions 100%.

"If all of you get on a clean-cut policy of advertising and selling, it s surprising how easily you'll get public acceptance and confidence in any set of reasonable fair trade practices.

"Get together weekly and discuss things frankly. Find out the other men's first names or nicknames and learn them.

"Getting together and staying together will eventually lead to constructive business-building activities and campaigns, in which you will actually:

"1. Sell the service rendered by appliances instead of the gadget features of each. Then you'll begin to go places; then you will be using united industry mass strategy on the public.

"2. Attract better salesmen.

"3. Have more emphasis on selling.

"4. Reduce salesmen turnover. The present situation in training salesmen, losing them, then doing it all over again is tremendously wasteful, discouraging and uneconomical.

"Don't take the attitude 'It won't work.' Habit is the worst enemy of net profit. You're all playing the football game of business with net profits the goal—there are bound to be some fumbles and bad plays, but the only way you'll reach your goal is by pulling together."

4 New Jersey Salesmen Qualify for Cruise

NEWARK — Four salesmen of Public Service Corp. of New Jersey already have qualified for berths on the company's nine-day all-expense cruise to Havana in September by selling more than 60 Kelvinator electric refrigerators each.

The company is sponsoring a "Return to Havana" campaign as successor to the Kelvinator Havana cruise in which salesmen for Public Service Corp. participated last year. To qualify, representatives must obtain 60 net installed sales between Feb. 19 and Aug. 21.

Current qualifiers are Albert J. Pastorini of North Hudson, Henry F. Slater of Perth Amboy, Louis Carfora of Jersey City, and Walter L. Adolph of Hackensack. The three first named were on the cruise last year. Mr. Adolph is a newcomer.

Outside Selling Needed to Close with Housewife Already Sold on Refrigeration, Secker Declares

DALLAS—Ardent advocate of outside selling is Harry G. Secker, operator of Knox Street appliance store and Modern appliance store.

"Floor selling alone," says Mr. Secker, "is not enough." He believes that prospective customers no longer have to be educated to the uses of electric refrigeration, but that it is now a problem of convincing the customer of the superiority of one box over another. And furthermore, he maintains that customers no longer come running into the store to find out which is the best box; it's up to the salesman to go to the customer's home.

The sales plan to which Mr. Secker attributes his "sounder business with more profit to the salesmen," consists of having the best salesman work on the floor, the rest in the field. "The indoor man," he says, "must be a good closer. Such a man can do a great deal for a salesman who is weak in this respect."

But in spite of the fact that the store's best man works on the floor, Mr. Secker reports that 75% of the store's sales are made outside. "Most of them are made at night, when both man and wife can be found at home," he declares.

Although floor demonstrations are pretty much passe in Mr. Secker's opinion, he believes wholeheartedly in home demonstration or approval sales, and claims that 75% or 80% of his sales are made after a unit has been placed in the home on demonstration. "We keep a carload of them out all the time," he says.

Ballard to Sell Westinghouse

PORTLAND, Me.—Ballard Service has been appointed local Westinghouse appliance dealer.

Cunningham Stoker Service Co.
3516 Woodward Avenue
Detroit, Michigan

May 27, 1937

Mr. R. C. Goddard,
Combustioneer Division,
The Steel Products Engineering Co.,
Springfield, Ohio.

Dear Mr. Goddard:

As you know, we have been selling COMBUSTIONEER for ten years and we would urge prospective dealers to grab a COMBUSTIONEER Franchise if it is available.

We firmly believe that COMBUSTIONEER has more sales appeal than any other automatic coal stoker. It has outstanding advantages in appearance and exclusive design and construction features. And COMBUSTIONEER's low installation and maintenance cost, plus the proved efficiency of its operation, make it outstanding in its ability to produce safe, dependable automatic heat at an economical cost.

We sincerely believe that COMBUSTIONEER's appeal in the current ready-to-buy automatic heat market gives it greater sales potentiality than any other home appliance or equipment product available to dealers today.

Sincerely yours,
CUNNINGHAM STOKER SERVICE CO.
J. G. Cunningham, Pres.

JGC:BC

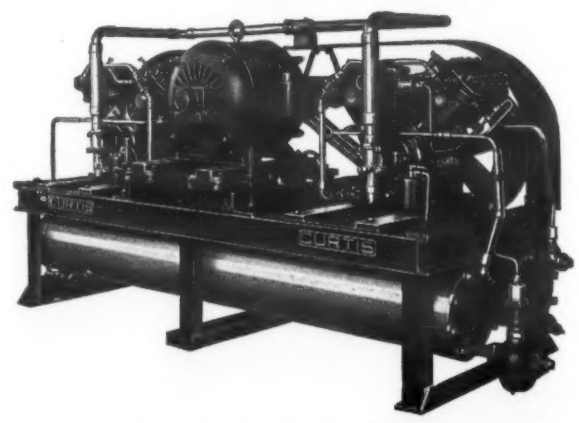
Write or wire us today for information about the Combustioneer Franchise. It's a money-maker. Don't let someone else beat you to it. Address Combustioneer, Springfield, Ohio.

STOKER MANUFACTURERS ASSOCIATION SMA

THIS YEAR IT'S
Combustioneer
AUTOMATIC COAL BURNER
FOR HOMES, APARTMENTS AND FACTORIES
★
DIVISION OF THE STEEL PRODUCTS ENGINEERING CO.

USE DRIERITE FOR DRYING
SOLIDS·LIQUIDS·GASES·SOLIDS·LIQUIDS·GASES·SOLIDS
Anhydrous Calcium Sulfate
Air
Refrigerants
Industrial Gases
Write for Literature and Quotations
W. A. HAMMOND, YELLOW SPRINGS, OHIO

In Air Conditioning



YOU CAN ALWAYS DEPEND ON CURTIS

More and more, with the growing demand for air conditioning, dealers and engineers alike are realizing the built-in quality of Curtis products which guarantees efficient, economical, carefree performance. There is a Curtis Condensing Unit for every air conditioning and refrigeration need.

● Curtis engineering created the patented "Centro-Ring" system of positive pressure oiling with no wearing parts. Curtis designing includes

1. Timken Tapered Roller Main Bearings
2. Water jacketed compressor heads and cylinders
3. Drop forged heat-treated crank-shafts and rods
4. Built-in oil separator with automatic return and automatic water valves
5. Precision manufacture throughout the entire unit

86 Air Conditioning units in the complete Curtis line from 1 ton to 30 tons.

Represented in Canada by
Canadian Curtis Refrigeration Co., Ltd.
20 George St., Hamilton, Ontario

CURTIS REFRIGERATION
AIR CONDITIONING AND COMMERCIAL

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 KIENLEN AVE. ST. LOUIS, MO.

Using Astrologer to Cast Horoscopes Proves 'Painless' Prospect-Getter For Scranton, Pa. Dealership

By W. H. Long

SCRANTON, Pa.—Using an astrologer to read prospects' minds and cast their horoscopes, while at the same time obtaining their names and the number of electrical appliances in their homes through a "painless" and entertaining process, has been put to good use by W. C. Carter Co., General Electric outlet here.

W. C. Carter, owner of the store, has been a specialty dealer for the past 11 years and now operates one of the largest appliance businesses in eastern Pennsylvania. And in that time, he says, he has learned that modern specialty selling requires new and unique angles to be effective.

For five nights—June 8-12—crowds from Scranton and nearby coal region towns jammed the Carter store to see and hear Alice Richey, prominent astrologer now touring the east under the sponsorship of the General Electric Co., in a program of "Music, Mystery, Magic, and Astrology."

About a week prior to the entertainment, Mr. Carter sent invitations to his mailing list inviting them to his store to witness Miss Richey's performance.

Recipients were asked to fill out their names and addresses on the invitations and turn them in at the door. Besides this information, they were asked to note whether or not they owned electric refrigerators and a list of seven other appliances.

Thus—a new and up-to-date prospect list for the Carter store obtained with little effort, no canvassing, and with no inconvenience to the customer.

As an additional inducement to get prospects into the store, a 152-page personal horoscope was offered free to each purchaser of a General Electric refrigerator or other major appliance. And when we talked to Mr. Carter in the middle of his "Astrology Week," business brought in by the program was enough to make any dealer's mouth water.

PUBLIC EXPECTS MORE

"Today the public expects more from the specialty dealer than ever before," declares Mr. Carter. "Besides service—the main foundation stone of any appliance business—people look to specialty stores to offer them more than the conventional sales talk and program. They want something on the order of these astrology entertainments to interest them in our line."

Asked what he considered the best method to assure the success of a specialty business, the Scranton dealer replied:

"The one sure policy I know is to stick to a good, well-known product and sell it year in and year out—and back it up with all the legitimate and **different** sales ideas at your command.

"By that I don't mean every crazy 'stunt' that happens to pop into your head. I'm talking about selling ideas that make the public like you and your store—something that offers them a good time or some enjoyment. You can find plenty of good, saleable prospects without bothering them every day. Give them what they like and they'll be in to see you when they want to buy."

Mr. Carter started selling appliances in Scranton 25 years ago at the age of 19 in a "two-by-four" shop, and now owns one of the finest stores in the city, employs 23 outside salesmen, and is known by his first name to half of Scranton.

He has been selling the General Electric line for several years, having handled both wholesaling and retailing in the Lackawanna county area up until the first of this year.

BUILDING REPUTATION

The reputation of a specialty store for selling the same line each year without additions or changes he views as one of the biggest assets in his type of appliance merchandising.

"Let's look at it this way," he continued. "Suppose one year a certain store is selling and talking up one brand to the skies, and the next time new models come out the public walks in and finds another line on the floor? What happens? Naturally customers lose all faith in the character of the store and its owner. They think it's just a money-making racket which would sell them anything it could.

"My belief is that most of the dealers who are bewailing dull 1937 business have themselves to blame. Last year they sold one line; this year they're selling another. People lose faith in their ability to service the boxes they bought from these stores, and they don't come back again," Mr. Carter stated.

"I don't blame a dealer for changing if he's taken on a 'lemon,' but few if any lines today are lemons. Store volume isn't built in a single year. It takes several years of effort, pushing one brand continually and building up local respect for its reliability. Specialty selling means steady selling."

About 80% of W. C. Carter Co.'s refrigeration business is procured by its force of 23 outside salesmen, says the owner. These men are instructed to "use the user" without pestering him. Inducing the prospect to come into the store to look new boxes over is the secret of the store's success.

Maintaining such a large selling organization in a city of 140,000 means protecting the salesman and assuring him a fair return for his efforts, says Mr. Carter.

To facilitate this, each salesman of the company has a "protected" territory which is entirely his own and in which other Carter salesmen are not allowed to approach prospects.

Recently, to spur his force on to greater efforts, this Scranton dealer staged a "Nudist Contest" in which 23 outside men, two inside salesmen, three saleswomen, and Mr. Carter himself competed. The contest lasted throughout May.

Posters showing the nude body of each member of the staff—including the saleswomen—were painted, and everybody started from their "birthday suit." Quotas were broken down (or "stripped down," says Mr. Carter) into 22 pieces of male and female wearing apparel.

As each section of the salesman's quota was made, one piece of clothing was painted on the posters—shorts first for the men and panties for the blushing sales ladies.

Several of the men, and all the women, finished the contest completely clothed. One unfortunate salesman never clothed himself with more than his shorts and undershirt and is still being jibed by his associates about it.

Advertising by means of newspaper insertions, radio, and billboards is being used by the Carter store to boost its sales. Besides using all three local papers, the company maintains 14 billboards in and around Scranton, and sponsors a 15-minute radio program each week in which a tie-in is made with a locally produced mayonnaise product through recipes.

Carter's has been selling Maytag washers for the past 25 years and now maintains two separate sales organizations on its refrigeration and washer lines.

8 Dealers Cooperate To Promote Sales

WICHITA, Kan. — Seven mechanical refrigeration dealers and one air-conditioning equipment dealer cooperated in promoting their products through a special section in the Wichita Sunday Eagle, June 13.

Participating dealers were: Crook Furniture Co., Grunow; Downtown Electric Shop, Norge; Hellums Furniture Co., Kelvinator; R. E. Ruse Furniture Co., Westinghouse; Southwestern Electric Co., General Electric; Thor Sales & Service Co., Frigidaire; Vowel Furniture Co., Crosley; Midwest Airtemp Corp., Chrysler Airtemp equipment.

Oil-fired Electrolux in Demand in Alabama

BIRMINGHAM, Ala.—To satisfy the increased demand of rural residents in this area for kerosene-burning refrigerators, Alabama Appliance Co., Electrolux distributor, has just received a six-carload shipment of new Electrolux kerosene units, according to Charles R. Rew, president.

It is understood that an agreement is being formed between the distributor and a local oil company which proposes to furnish tanks and deliver kerosene direct to owners of kerosene refrigerators.

Reports from Alabama Appliance Co. indicate that the 11-cu. ft. boxes are in greater demand than the 4-cu. ft. units. Addition of a number of new dealers also has been announced.

250 Frigidaire Dealers Meet in Seattle

SEATTLE—About 250 Frigidaire dealers of western Washington recently attended a special meeting held by Sunset Electric Co., Seattle Frigidaire distributor, to outline its mid-summer sales program.

E. L. Williams, Frigidaire regional household manager, and George W. Shane, regional commercial manager, spoke to the group on behalf of the factory.

Sunset Electric executives who addressed the meeting included: Gordon Prentice, president; Charles Stewart, general manager; and J. W. Condon, Jr., sales manager.

Lurie's Jewelry Store Adds Appliance Department

SEATTLE—Following the lead of other jewelry stores in this vicinity, Lurie's jewelry store, one of Seattle's pioneer jewelers, has added an appliance department. This addition has made larger quarters necessary.

"Listen Boss—

Here's How You Can Get TRAINED Men"

U.E.I. Free Placement Bureau will put you in touch with a trained, competent worker. U.E.I. trained men have made good as shop mechanics, installation and service men in this industry for 10 years. This service is Free to you and prospective employee. Try it.

UTILITIES ENGINEERING INSTITUTE
404 N. Wells St. Chicago, Illinois — Established 1927 — 17 West 60th St. New York, N.Y.

RAY P. JOHNSON
Manager
Refrigeration—
Heating Dept.

Borg Warner
Service Parts
Company

Chicago, Illinois

"As you know, we service the automatic heating trade as well as refrigeration and air conditioning. Both our Chicago and Detroit stores report an equally increasing demand for A-P products."

Very truly yours,
Borg Warner Service Parts Co.

R. P. Johnson, Mgr.

MERCHANT & EVANS
USES
SYLPHON BELLOWS
for Crankshaft Seals

Famous for superior engineering, the finest materials and workmanship, reflected in the quiet, highly dependable service of M. & E. refrigeration units—Merchant and Evans naturally selected Sylphon Seamless Metal Bellows for crankshaft seals in these units.

For this seamless, jointless, "miracle in metal" provides the durability of metal while supplying the flexibility of less substantial, out-dated materials.

Time-tested beyond doubt in the products of the leaders in the refrigeration industry, this most highly developed metal diaphragm is the result of over 35 years of constant research and application experience.

The benefits of this experience are yours for the asking. Write for Bulletin NO-121.

FULTON SYLPHON CO.
KNOXVILLE, TENN., U.S.A.

Go to Your Jobber For Your A-P Controls . . .

When service men in widely separated cities, increase their demands for A-P products, it indicates that they are having unusually satisfactory experiences with those products.

And that's true.

Of the many reasons why you too will like A-P Controls, few will please you more than the extreme simplicity with which they are cleaned and inspected.

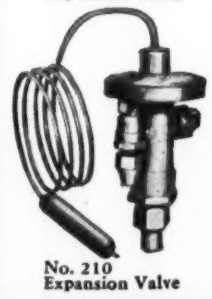
On the new 73 RB Solenoid or any of the Expansion Valves, just remove the bottom nut. The parts drop into your hand.

You leave the valve on the line and spend only a few moments at this operation. A-P Controls are time and money savers!

Progressive jobbers everywhere stock A-P Controls.

No. 73RB Solenoid

No. 205 Expansion Valve


No. 210 Expansion Valve

AUTOMATIC PRODUCTS COMPANY
2450 NORTH THIRTY — SECOND STREET
MILWAUKEE WISCONSIN

AIR CONDITIONING NEWS

Pipe Trades Assn. Seeks Air Cooling Ordinances

MILWAUKEE — State legislation for better supervision and inspection of air-conditioning and heating systems will be sought by the executive board of the Wisconsin Pipe Trades Association.

This announcement was made at the organization's silver jubilee convention, during which the following new officers were elected: Arthur Olsen, Milwaukee, president; Charles Drexler, Menasha, first vice president; A. J. Jameson, La Crosse, second vice president; Edward Burkard, Sheboygan, third vice president; and Anthony J. King, secretary-treasurer.

Peoria Dealers Fight Law Requiring Operators

PEORIA, Ill.—An ordinance, requiring stationary engineers at establishments operating air-conditioning or refrigerating equipment of more than 10-ton capacity, was protested by more than 30 building owners and operators at a hearing held June 28.

The argument was that the ordinance would "drive them out of business."

Additional hearings will be held on the measure, which is now before the Peoria city council.

Natkin to Have Larger Quarters in St. Louis

ST. LOUIS—Natkin & Co., southwestern division agent for Westinghouse air-conditioning equipment, will move to quarters at 3920 Lindell Blvd. in September where it will have 10,000 sq. ft. of floor space, compared to 840 sq. ft. at its present location.

The firm, of which S. J. Shure is manager, has recently added six employes, bringing its staff to 100.

Deluxe Tourist Cabins Now Air Conditioned

NEWARK—A tourist-cabin-barbecue set-up is the site of one of four Carrier air-conditioning installations for somewhat novel applications recently announced by Carrier Corp. here.

To supplement the modern luxury of its five adjoining tourist cabins—furnished with thick rugs and tiled baths and separated by a winding driveway bordered with flowers—"Y" barbecue of St. Joseph, Mo. has installed equipment providing winter air conditioning for both restaurant and the cabins.

The new Carrier system replaces an older, unsatisfactory one.

Plans for extending the system with cooling coils to provide summer comfort are being considered.

Since the Empie & Watkins Casino, also in St. Joseph, has been equipped with a year-around conditioning system with automatic temperature control, business has improved 40%, according to claims of the owner.

Holly's grill, luxuriously furnished dining car in Kalamazoo, Mich., and third in this list of Carrier installations, advertises as "Michigan's Finest Dining Car."

To avoid low-receipt "dog-days," Butter-Krisp-Do-Nut shop in New Orleans has been conditioned for summer cooling. It reports that checks have increased and food odors been eliminated.

Air-Cooled Mail Cars Demanded by Clerks

HOUSTON, Tex.—Air conditioning of railway mail cars was demanded in a resolution passed by delegates to the eleventh division Railway Clerk's Association's convention held here recently.

Delegates to the national convention, to be held Oct. 18, will be instructed to seek congressional legislation providing for air-conditioned cars and mail terminals.

Laboratory Conditions Soil Specimens

VICKSBURG, Miss. — Dirt may seem a peculiar substance to air condition, but that's just what happens to soil samples tested in the U. S. Soil laboratory here.

These samples are shipped to the laboratory in paraffin containers which are then stored in rooms equipped with an electrically operated humidity machine to keep the soil moist, and ½-ton portable air conditioner to prevent melting of the paraffin.

Soil specimens are then weighed and tested for various qualities before being subjected to intense, steady heat on a 30 kw. drying rack to remove all moisture and prepare them for final test readings.

36 Exhaust Fans Installed in Hudson River Auto Tunnel

NEW YORK CITY — Thirty-six Buffalo Forge Co. "Limit-Load" fans are being installed to remove carbon monoxide fumes emanating from the exhausts of automobiles passing through the new midtown Lincoln vehicular tunnel under the Hudson river at 39th St.

Air will be both forced into and drawn from the tunnel so that positive ventilation will be assured.

Seventeen of the huge 10-ton fans will supply a total of 3,218,000 cu. ft. of fresh air to the tunnel per minute, the equivalent of 185,000 tons per day. The other 19 will serve as exhaust fans, their total capacity is claimed to be in excess of 3,000,000 c.f.m.

It was pointed out that the air supplied will be sufficient to supply 35 lbs. of fresh air per day to each of 10,600,000 persons.

Charlotte, N. C. Dealer Adds Men as Orders Pile Up

CHARLOTTE, N. C.—Two men have just been added to the force of the S & W Refrigeration Service Co., to enable the firm to keep up with air-conditioning orders, announces G. W. Smithson, manager.

Air-conditioning installations have just been completed at McLelland's store, Charlotte, and at the Elk theater, Elkin.

Electric Air Cleaner Aids in Treating Hay Fever Cases

CHICAGO—An electric air cleaner, which is finding successful use in treating cases of hay fever and asthma, as well as is winter air conditioning in cities where soft coal is used as fuel, was described to Edison Electric Institute members by Dr. L. W. Chubb, director of research for Westinghouse Electric & Mfg. Co.

"Cleaning of the air is one of the many divisions of air conditioning—it is not a new subject, but an important one," Dr. Chubb said.

"The smoke and dirt problem is usually associated with the industrial cities, and smoke abatement activities have been quite effective in doing away with a greater part of the factory smoke which, in the past, was so disagreeable.

"The smoggy days continue in the large cities where soft coal is burned, and where there is no appreciable movement of the atmosphere. This pollution of the atmosphere is, today, not due so much to factories, but rather to the thousands of threads of smoke coming out of residential and business buildings.

"This cleaner has been developed on the assumption that we are going to clean only the indoor air, to remove all suspended matter, dust and small smoke particles which are so detrimental to health, soil curtains, walls, and tax the patience and budget of the housewife.

"Air washing and filtering methods commonly used take out only the coarse particles and are ineffective in removing the very fine dirt which is the most detrimental. The new system is not only free from these troubles, but it is much more efficient and effective in operation," we claim.

"Filtering, in the sense of providing pores so small that fine smoke particles cannot pass through, is impractical because such pores do not pass sufficient air. Centrifugal devices or attempts to impinge particles onto adhesive surfaces are ineffective in removing fine particles because such particles travel with the air to such an extent that only a small percentage of the fine dirt is caught.

"Electrostatic forces acting upon such small uncharged particles are negligible. However, when charged with 10 electrons, the forces of attraction in an electric field may easily be made a million times as great as the gravitational force alone which nature uses to settle particles out of the air. This is the important advantage possessed by the electrical method.

"Electrostatic precipitation consists essentially of imparting a charge to each dust particle and then attracting the particle out of the air. In former systems, both functions were performed in a single chamber. The charging is obtained by a high voltage corona discharge which produces ozone and nitrogen fixation.

"In our system, the charging and deposition are separated, the voltage adjusted within a critical range, the electrical field so shaped that these serious objections are eliminated and the efficiency greatly increased. This precipitator is particularly adapted for use where the cleaned air is to be subsequently breathed by the occupants of a room.

"Hay fever and types of asthma caused by air-borne pollen and invisible particles are quickly relieved. In many cases of asthma and hay fever, patients have obtained complete relief while they remain in the room where the air is electrostatically cleaned.

"The cleaner is giving satisfactory service in cleaning the air in rooms housing the relays of automatic telephone exchanges. An unexpected application has been the cleaning of CO_2 gas ahead of the compressor in a dry-ice plant.

"In certain processes of generating the carbon dioxide, there is a large amount of very fine suspended salt which is too fine to be removed by filters or washers but which the cleaner can readily remove. The use of a cleaner in this application very quickly pays for itself by reducing compressor maintenance.

"Probably one of the largest applications is in air conditioning of residences in cities where soft coal is burned."

Airtemp Establishes Sales Offices in Atlanta

ATLANTA—Establishment here of Airtemp Sales Corp., in the Candler building as regional headquarters for Airtemp, Inc., has been announced by A. C. Downey, president of Airtemp, Inc. J. Robert Durham has been named general manager of the new branch.

Airtemp Sales Corp. will serve as the clearing point for all Airtemp distributors in the southeastern section of the country.

American Blower Establishes Engineering Staff at Dallas

DALLAS—American Blower Corp. has established a staff of four factory-trained engineers here to aid dealers and installation firms handling its line of Ventura home conditioners.

C. S. Becker is Texas general manager. District managers are: H. J. Templeton, Dallas district; M. W. Brown, Houston and San Antonio district; P. V. Flynn, Rio Grande valley district.

A. Harris & Co. and Groves Lumber Co. are Dallas dealers for Ventura equipment.

During the long, hot, sultry stretch of summer, many of the living, working and buying comforts assured by Air Conditioning depend on the motors that drive the equipment used in the complete installation. That's why it pays to give serious attention to these definite advantages of Century Squirrel Cage Motors:

(1) They Start Quietly . . . (2) Run Quietly — No Disturbing Noises . . . (3) Are Remarkably Free from Vibration . . . (4) Keep Themselves Clean Inside . . . and (5) Are Easy to Keep Clean Outside.

Specify Century with confidence — pioneers in the motorization of Air Conditioning equipment — backed by 34 years' of knowing how to build better motors and properly apply them.

CENTURY ELECTRIC COMPANY
1806 PINE ST., ST. LOUIS, MO. OFFICES AND STOCK POINTS IN ALL PRINCIPAL CITIES

Century

SIZES UP TO 600 HORSE POWER

PREST-O-LITE TORCHES
Save Time and Money

Pumping and preheating are eliminated when you use Prest-O-Lite torches for soldering, brazing or heating. The intensely hot Prest-O-Lite air-acetylene flame is concentrated, and can be directed exactly where needed. This assures fast, uniform work without damage to adjacent materials. It also saves many dollars by reducing the amount of ripping and patching and prevents waste of fuel between joints.

Ask your jobber for complete details or write to the Linde office near you.

PREST-O-LITE GAS

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
New York and Principal Cities
In Canada: — Dominion Oxygen Co., Ltd., Toronto

SPECIALTY SELLING IDEAS

Temprite's Direct Mail Breaks Down Prospect's Prejudice and Opens Way to Demonstration

By Gordon Muir, Advertising Manager, Temprite Products Corp.

Following the repeal of prohibition, literally dozens of so-called "beer cooling systems" were launched on the market; a great many of them died a natural death in short order.

Their chief appeal was low price, and a lot of tavern owners fell for it. The result was that they were bitterly disappointed in performance, and a reaction against mechanical beer cooling systems, however good or bad they might be, was born.

Naturally Temprite was included in this wholesale judgment, and distributors in various parts of the country complained that a lot of tavern owners would not even listen to the Temprite story.

USE OF DEMONSTRATOR

Accordingly, Temprite management had to evolve a method whereby the claims of Temprite could be forcibly and favorably brought to the direct attention of the dispenser.

The answer to this problem was the Temprite portable beer demonstrator. This self-contained demonstrating unit is built around a ⅓-hp. air-cooled compressor regardless of make. Everything is complete; even a tapping rod is provided. It is small in size, portable, and can be transported in the trunk of an automobile.

In practice, the demonstrator is taken to the premises of the interested dispenser and rolled behind the bar or to some other convenient location.

The demonstrator can be left with the tavern owner for an entire day, because, in addition to being a demonstrator, it is a practical beer dispensing device.

HARD TO GET INTERVIEWS

The success of this portable demonstrator was gratifying whenever a tavern owner would listen to the offer of the salesman to demonstrate Temprite claims in his own bar. But very often the old difficulty cropped up, the tavern owner being unwilling to give the salesman a reasonable interview.

To break down this preliminary barrier, Temprite constructed a direct-mail campaign to cover in time every tavern in the country where considerable quantities of draft beer are sold. This campaign consists of five folders or broadsides, each setting forth various claims in performance and graphically illustrated in four colors.

Folder number 1 has the question "CAN YOU?" on the outside or address side of the folder to lead to the question, which is "Can you tap a keg of 60° beer and draw it right away?"

To the tavern owner, drawing a keg of 60° beer means that he is going to have "wild" beer. Temprite claims in this folder to tame wild beer, thereby increasing both the profit and prestige of the dispenser.

"HAVE YOU"

The second folder has the question "HAVE YOU?" on the address page leading into the question, "Have you ever made a temperature analysis of your beer?"

This second folder explains that the amount of foam or head which forms in a glass of beer is proportional to the temperature at which it is drawn, and goes on to show by illustration and text that, unless the temperature is right, there is a loss of 30 glasses per half barrel when beer is too warm, and 30 glasses per half barrel when it is too cold. This waste means considerable loss to the tavern owner.

The third folder has the query "DID YOU? on the address side, leading to the question, "Did you ever add up your old ice bills?" The folder shows by illustration and text that, if dispensers would add up their old ice bills, they would probably realize that they had already paid for a Temprite.

BARTENDER RHYTHM

The fourth folder has the query "DO YOU?" on its address page, leading to the question inside, "Do you have Bartender Rhythm?" This folder is the most comprehensive of the entire series from the bartender's point of view, and asks ten questions on page 2 such as:

1. Do you spit the faucet? 2. Do you have wild beer when you first tap a keg? 3. Do you have flat beer near the end of the keg, etc.? It goes on to show that if a bartender is a victim of any of 10 hazards when drawing beer, then he does not have "bartender rhythm," and declares that "bartender rhythm" is only possible with a Temprite beer cooling system.

REPLY CARD SCHEME

The fifth and last folder has the question "WILL YOU?" on the address page leading into a question on the second page which asks, "Will you try Temprite free?"

This fifth folder is devoted to elaboration of the statement that Temprite is ready to prove every claim made in the previous folders, and do it right in the tavern without costing the tavern owner one cent. It displays the Temprite portable demonstrator hooked up to a keg of beer, and challenges the tavern owner with, "You draw the beer and if Temprite doesn't sell itself, don't buy it!"

Each of the five folders contains a reply-paid post card which only requires the tavern owner's signature and address to complete, and requests Temprite to bring along a portable beer demonstrating unit and prove its claims without expense or obligation to the inquirer.

EARLY RESULTS SHOW VALUE

The opening gun of the campaign was fired in Pittsburgh last week, and already the first folder has proved its drawing power, with one distributor alone reporting having obtained more than a dozen A-1 prospects the first week.

These reply post cards are mailed immediately to the Temprite distributor or distributors participating on a cooperative basis in the campaign, and each prospect gets a letter direct from Temprite acknowledging the post card and stating that the such-and-such distributor is an authorized Temprite distributor, and that he will call and put on a demonstration.

Free Service Offer While Canvassing Opens Doors, Inspires Housewives' Confidence, and Leads to Sales, Kenosha Dealer Finds

KENOSHA, Wis.—By using a service rather than a sales approach, Clifton Grosvenor of Grosvenor Appliance Co. has found that he can get inside the front door while canvassing and, as a result, net more sales by his efforts.

Doing much of the company's canvassing himself, Mr. Grosvenor spends every afternoon making calls.

When the housewife comes to the door, Mr. Grosvenor explains that he is making a survey of appliances and asks if any are owned in the house. Perhaps she mentions two or three and adds that she isn't in the market for any more.

At this point his approach takes a new tack. He asks how her appliances are working, and, according to Mr. Grosvenor, she will usually have some complaint to make. This is just the opening he has been looking for. He offers to look at the appliance free of charge, and this offer gets him through the front door.

Having gained entrance, Mr. Grosvenor wins the woman's confidence and good will by examining the offending appliance, advising her what needs to be done, and, if possible, repairing the faulty machine on the spot.

While he is so engaged, he learns about all the other appliances in the house, and can determine whether the people there are good prospects for new sales.

Having made this much progress, the salesman is in a far better position to begin a sales presentation than he was when he was standing on the front porch, Mr. Grosvenor says.

And this method of gaining entrance has wide possibilities, according to Mr. Grosvenor, because almost every appliance owner has some little, pet grievance against one appliance or another.

Since practically every house contains electrical appliances of some sort, the dealer who wants to sell new ones will find it to his advantage to talk first about the old appliances and, secondly, about the ones he wants to sell.

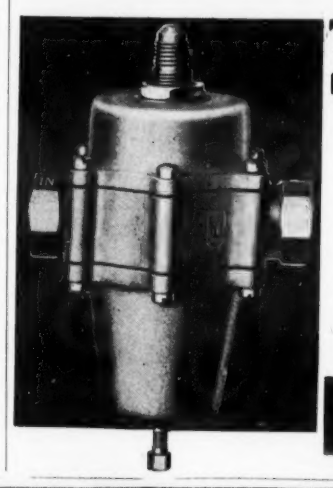
Example of good will resulting from Mr. Grosvenor's canvassing technique is the story of an elderly lady who complained that her electric range never baked her cakes right.

Inspection showed that a small screw had fallen out of the thermostatic controls. Using a screw driver and his own thermometer, Mr. Grosvenor quickly made the repair.

Several weeks later the same lady walked into the Grosvenor store and announced that she had come to buy an electric refrigerator. Reason she gave was that Mr. Grosvenor had been so nice to her.

Another way of increasing new appliance sales, according to Mr. Grosvenor, is to advertise used appliances in newspapers.

After prospects come in to see the second-hand machines, the comparison between new, smoothly running appliances and noisy or damaged used ones, helps sell the new, Mr. Grosvenor reports.



TAG WATER CIRCULATING VALVES
For Service Replacement *profits*

The sound design of the TAG Water Circulating Valve for water cooled compressors shown here is best reflected by its wide acceptance as standard equipment on so many prominent makes of commercial machines. Likewise, its utility as a preferred item for both customer satisfaction and service replacement profits is undisputed.

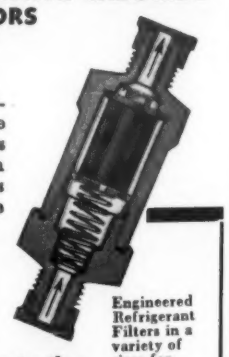
There are other equally notable TAG Controls and Test Equipment for Refrigeration Service that you should know about. Send for a copy of the new TAG Catalog No. 1136-25.

ASK YOUR JOBBER ABOUT TAG WATER CIRCULATING VALVES, CONTROLS, & TEST EQUIPMENT.

C. J. TAGLIABUE MFG. CO.
Park & Nostrand Ave's., Brooklyn, N. Y.

USE THE ZENITH REFRIGERANT FILTER

. . . FOR SULPHUR DIOXIDE FREON OR METHYL CHLORIDE REFRIGERATORS



Because

Zenith elements provide finer spacings (.002") than any asbestos sack or wire screen filter.

Easily Installed

Easily Cleaned

Permanent Protection

No Wool or Asbestos to Rot and Wear Out

Corrosion Proof—Leak Proof

Ample Capacity

Engineered Refrigerant Filters in a variety of sizes for varying capacities.

Positive protection against dirt in Expansion Valves, Solenoid Valves, Capillary Tubes and other liquid control devices.

ZENITH CARBURETOR CO.
Subsidiary
BENDIX AVIATION CORP.
Detroit, Michigan.

REFRIGERATION
PRESSURE CONTROLLER
Sealed-in
PERFORMANCE
MINNEAPOLIS-HONEYWELL Refrigeration Controls are now sealed against corrosion, dust particles and changes in atmospheric conditions. Visible scales are mounted behind a glass panel which effectively seals in the performance which has made these controls so outstanding. Ratings have been increased, differentials made closer, while a new finish enhances their appearance. But, despite all these improvements, Minneapolis-Honeywell Refrigeration Controls are available at new low prices . . . Complete information on these new developments is now ready. Write for it. Minneapolis-Honeywell Regulator Company, 2807 Fourth Avenue South, Minneapolis, Minnesota.
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BROWN INDUSTRIAL INSTRUMENTS • NATIONAL PNEUMATIC CONTROLS

COMMERCIAL NEWS

Air Conditioner Does Two Jobs for Florist

SAN FRANCISCO—To prevent the flowers from wilting and spoiling the effects of the carefully designed window displays for which they are noted, Podesta and Baldocchi, florist, installed a Carrier air-conditioning system in its store here.

Conditioning both the basement, where the employes of the firm work, and the ground floor, where the floral display are kept, the equipment maintains a temperature of about 64° F. at all times. Prior to the installation, the average temperature in the store was from 72 to 75° F. and flowers wilted quickly unless kept in a special refrigerator, lessening their display effectiveness.

Air is drawn in from outdoors, cleaned and washed, cooled, and distributed by fans through ducts to the store, basement, offices, and mezzanine.

In expressing his satisfaction with the air conditioning, N. F. Baldocchi, co-partner, said:

"Now that we know what it is, we feel that we could not possibly do without air conditioning. The flowers last longer, there is less waste, and working conditions are more comfortable and pleasant, enabling the staff to turn out more work with less effort."

Transport Planes Keep Food Under Refrigeration

NEW YORK CITY — Transport planes with refrigerator compartments for shipment of perishables will be placed into operation in July by Northwest Airlines between Chicago and St. Paul, according to Leslie B. Farrington, traffic manager of the line.

The ice-cooled, insulated refrigerator compartments of these 10-passenger planes will be suitable for carrying fruits, vegetables, meat, or flowers.

Refrigerated Truck Travels 800 Miles Weekly

SAGINAW, Mich.—Meat delivered in the new truck of L. A. Henning Co. here is kept at temperatures between 35° and 40° F. by a Frigidaire condensing unit and Dry-Zero insulation.

Body of the truck, built by Schultz Bros. here, is insulated with 3-inch Dry-Zero blanket in the roof, 2½-inch Dry-Zero blanket in sides and ends, and with cork in the floor.

The truck body has a 3-ton capacity, and is mounted on a Ford chassis. It travels about 800 miles a week, serving an average of 25 customers per day.

Refrigeration Preserves Vitamin in Vegetables

FRENCH LICK, Ind. — Studies covering seasonal variations in the vitamin C content of fresh market vegetables, made by the Birdseye Laboratories of Boston, added proof to the fact that refrigeration plays a major role in preserving the vitamin C content of the fresh vegetables during the marketing period, declared Gardner Poole, vice president of the Birdseye Co., before the opening technical session of the midyear meeting of the A.S.R.E. recently here.

The investigation, preliminary to a study of the stabilization of the vitamin C content of quick frozen vegetables, was made by S. L. Feener, Virginia Palmer, and G. A. Fitzgerald of the Birdseye Laboratories.

Data obtained called attention quite obviously to the fact that by proper applied refrigeration throughout the marketing period, the vitamin C potency of fresh market vegetables may be preserved through a normal marketing period almost intact.

While products held at 34 to 38° F. showed little or no change in vitamin C content for long periods, some held at 69 to 72° F. could not be termed marketable after 72 hours, at which time they had lost in addition from 50 to 90% of their original vitamin content.

Spinach, long associated in the public mind as a vegetable with health-sustaining powers, loses its vitamin C very rapidly unless protected by refrigeration. On the other hand, at low temperatures there is very little loss.

Kold-Hold Units Maintain –10° F. Condition in Truck

INDIANAPOLIS — A temperature of —10° F. is maintained in each of two new truck bodies built by Giffel Body Mfg. Co., Terre Haute, Ind., for Banquet Ice Cream Co. here.

The bodies are refrigerated by Kold-Hold units and are insulated with 6 inches of Dry-Zero blanket in the roof, 6 inches of Dry-Zero Sealpad in sides and ends, and 6 inches of other insulation in the floor.

Each body carries 400 gallons of ice cream. The newer of the two mounted on an International 1937 DeLuxe chassis.

The trucks make approximately 75 stops in their daily routes.

Even Bait Is Refrigerated On the Grand Banks

PORT AUX BASQUES, Newfoundland—Refrigeration, making rapid strides here during recent years, perceptibly has changed public tastes in food stuffs through an increasing influence on the fishing industry.

Latest development in connection with fishing is the provision of a chain of cold storage depots for frozen bait. A total of 19 refrigeration plants now are in operation. Of this number, seven are government-owned bait depots, seven are privately-owned stationary plants, and five are vessels equipped for refrigeration.

Largest of the refrigeration systems is the government-owned plant at Port aux Basques with a sharp-freezing capacity of 10,000 lbs. per day, and storage provisions for 300,000 lbs. of bait. The other plants have sharp-freezing capacities of 5,000 lb. per day, and storage capacities of 100,000 lbs. One of the refrigerated ships, the **S. S. Malakoff,** also is owned by the government.

The system by which refrigerated facilities are made available to the fishing industry is on the following basis: each fisherman is given a receipt for half the number of pounds of fish which he stores; the other half becomes the property of the depot and is sold to defray operating costs.

McAdam Joins Engineering Staff of Los Angeles Firm

LOS ANGELES — Refrigeration Engineering, Inc., manufacturer of Recold household and commercial evaporators, has announced the addition of H. H. McAdam to its engineering staff. Upswing in sales, says H. T. Jarvis of the company, necessitated the addition.

Mr. McAdam formerly was connected with the engineering research and test department of Brunswick-Balke-Collender Co.

'Model Office' Displays Room & Water Coolers

CHARLOTTE, N. C.—A. C. Summerville has joined the commercial sales department of Page-Williamson, Inc., Kelvinator dealer.

Page-Williamson recently opened a model office in Commercial Bank building for practical demonstration of Kelvinator room cooling and water cooling units.

Universal Cooler Names Outlet in Calgary

CALGARY, Alberta, Canada—Universal Cooler Co. of Canada, Ltd. has appointed Electrical Wholesalers, Ltd. distributor for its line of commercial equipment and Ashdown's as distributor for its domestic refrigeration.

Installation work on commercial equipment is to be handled by Electric Crafts, Ltd.

Frosted Seafoods Firm Formed in East

NEW YORK CITY—Z Pack Corp., owner of the "Z" quick-freezing process, has announced formation of "Haven Brand Frosted Seafoods Co.," as a division of Harold E. Hamblen, Inc. here.

A full range of round fish, pandressed fish, oysters, scallops, and other seafoods will be handled by the company for both institutional and retail trade. Of special interest will be quick-frozen filleted sea trout, bluefish, and weakfish, which up to now have not been available in this form.

Mack's to Distribute Servel In San Diego County

SAN DIEGO, Calif.—Mack's Refrigeration Service has been appointed distributor of Servel electric refrigeration and air-conditioning products in San Diego county.

Weber Displays Models On Platform Trailer

LOS ANGELES—A small open platform trailer pulled by a new Ford coupe is used by Weber Showcase & Fixture Co. to take sample units right to the door of interested dealers.

3 Pelco Bottle Coolers Installed in Tavern

INDIANAPOLIS — Three large-size Pelco model 240 beverage coolers have been installed in the Hobnob Tavern, Terre Haute, Ind., by Cloud & Son, Pelco distributor here.

'Cold Diffuser' Installed For Beverage Store

ELIZABETH, N. J.—A completely automatic Carrier refrigerating machine, controlled by thermostatic adjustments, has been installed in William Johnson's beverage store here to cool bottled beer. Connected to the machines is a cold diffuser.

Servel Calls Redemption Of Bond Issue

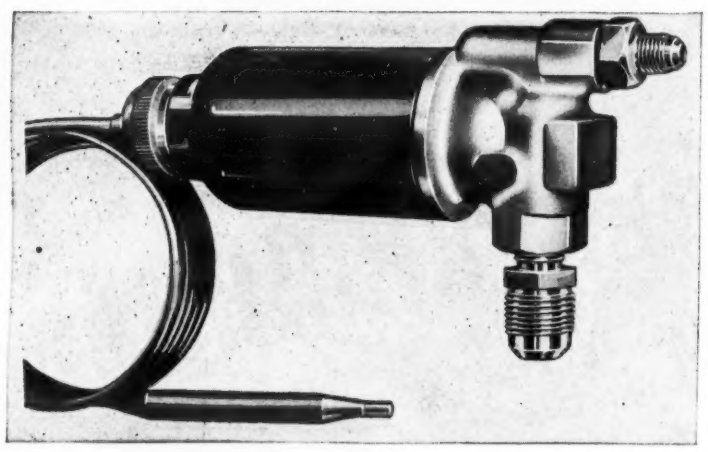
NEW YORK CITY—Servel, Inc. has called redemption on July 1 at 105 and accrued interest, $500,000 principal amount of first mortgage 5% bonds, due 1948, according to recent reports.

STANDARD REFRIGERATING APPLIANCES

Another...

OUTSTANDING VALUE

COMBINING MANY NEW and ADVANCED FEATURES



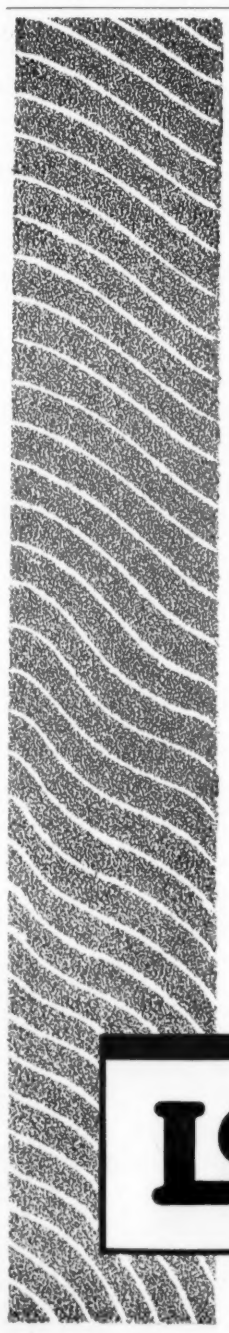
TYPE "B"

THERMOSTATIC VALVES

These rugged, dependable valves assure a brand of performance which sets a new high mark for products of this nature. They are constructed of the finest materials available to the industry. A forged body, tough, non-porous and finely machined is only a part of the many new features embodied in these valves. Others include easily removable needles and seats, removable power elements (which have always been gas-charged) easily changed in the field. Adjustable and accurate to a fine degree. .093 orifice standard but .078, .125 and .156 available on order. ½" S.A.E. outlet standard with ⅜" or ⅝" available on request. ¼" S.A.E. inlet.

Write for bulletins on the complete line of Blue Ribbon appliances

AMERICAN INJECTOR COMPANY
RILEY ENGINEERING CORP. *Associate*
1481-14TH St. • Phones LAFAYETTE 0350-0552 • DETROIT, MICH.



condensers evaporators

for electric refrigeration and air conditioning applications — domestic and commercial.

LONG MANUFACTURING DIVISION
BORG-WARNER CORPORATION

LONG

DETROIT, MICH.
WINDSOR, CAN.

BINKS TOWERS SAVE MONEY!

Indoor Forced Draft Type

FORTIFY yourself on the water consumption & disposal problem which is becoming more difficult. In many sections, MAINS (both supply & disposal) are becoming inadequate as industries' demands for water increase.

Use BINKS TOWERS! They give constant recirculation and cut water bills as much as 80%.

Write for Bulletin 70 Today!

BINKS MANUFACTURING Co.
3114-40 Carroll Ave., Chicago.

Installing Cases in Series

One of the largest commercial case installations made recently in eastern Pennsylvania, this equipment was installed by Automatic Equipment Co. in the new store of the New American Coffee Co., Scranton. Hill cases are installed in a series of "islands" to cool meats, fish, fruits, vegetables, and delicatessen products. In the basement are installed four Frigidaire 1½-hp. water-cooled units and one ¾-hp. compressor.

Commercial Unit Salesmen Must Depict What a New Installation Will Do for an Establishment, Says Veteran Dealer

By W. H. Long

SCRANTON, Pa.—If you visualize for the prospective customer what a commercial installation can do to improve the appearance of his store, you can sell him 90% of the time with surprising ease, says H. W. Persbacker, commercial sales manager for Automatic Equipment Co., retailers of Hill display cases and Frigidaire commercial equipment here.

Such old-time selling arguments as the need for mechanical refrigeration and its superiority to ice-cooled boxes are outmoded, this Scranton dealer thinks. A new approach is needed—one which will touch the prospect on his tenderest side, where sales resistance is weakest.

And that side is his pride in his own store—its modern appearance, eye appeal to customers, and its reputation for having it "all over Jones' market down the street" for up-to-date and attractive displays of food products.

After 12 years of selling commercial to merchants and market owners in the anthracite region, 85% of whom are foreign-born and don't care a whoop for all the smartest sales literature ever written, Mr. Persbacker has found that, if he shows them by blueprint and water-color drawing how his line will improve their stores, a sale isn't far off.

REMODEL STORE ON PAPER

"Merchants around here—and I think all over—resent high pressure selling," declares Mr. Persbacker. "But if you take the trouble to remodel their stores on paper and show them what modernity means in business today, you can readily win their attention, their time, and their orders.

"Before I start talking turkey to a prospect, I take a good look at his store and the commercial problem it presents. Then I fill out a form layout we have arranged covering the store's general set-up, and next a blueprint of the cases to be installed, dimensions, location of compressors, etc.

"By this time, our market owner is definitely interested," the Scranton commecial man continued. "The next move, if he appears on the verge of buying, is to have a complete water-color drawing of the store made for us by the C. V. Hill Co. There we really have talking points."

On the walls of Mr. Persbacker's office are several water-color drawings of commercial installations in Scranton, Wilkes-Barre, and other Lehigh Valley cities, which proved to be sales-clinchers for Automatic Equipment Co. One elaborate affair represents a $15,000 market layout which closed the sale where all sales-talking had failed, he said.

This plan doesn't stop with pictorial representation of commercial cases and units alone. Linoleum, shelves, color schemes, and even lighting fixtures—in short, the completely redesigned store—are placed before the prospect.

No attempts are made to allow the merchant to believe he has been placed under obligations, says Mr. Persbacker. If he balks when the order blank appears, the blueprints or drawings are simply presented to him gratis with no strings tied. But, in nine cases out of 10, the prospect is so impressed with the job a few days' thinking it over generally brings a "come on over and talk business" phone call.

"We are not endeavoring to sell the need for commercial refrigeration any more," declared the Scranton man. "That's taken for granted. We sell on dollar-for-dollar return coupled with low depreciation on our equipment and the fact that a modern installation improves the looks and reputation of a store 100%.

"After all, merchants are aware today of what sanitary equipment and modernistic-looking store setups mean to them. And the buying public knows it, too. So why talk about the old sales points? Show them what you have to offer where they can visualize it for themselves in their own stores—not what an installation looks like in a big city market they'll never see."

Automatic Equipment Co.'s commercial salesmen follow the policy of taking prospects around to their installations made several years before, not particularly those of the past one or two years.

SHOW ORDER JOBS TO PROSPECTS

The object of this, says Mr. Persbacker, is to show them that his firm's installations last. Any installation may be assumed to last until it is paid for, he declares, but how about the job that has been working for five, eight, or even 10 years? Using the old Packard motto:—"Ask the man who owns one"—pays dividends these days, he believes.

By keeping an exact checking file of every installation made since he started selling commercial in Scranton in 1925, especially repair bills and service charges, this dealer has developed another strong sales argument. This is of particular value in selling replacement jobs to old customers.

Each installation carries a filing sheet showing the date and cost of every service call. These are kept handy where they can be shown to the past customer or prospect at a moment's notice.

Not long ago, says Mr. Persbacker, he approached an old customer who complained loudly about the repair charges on his 1-hp. walk-in cooler installed several years before. This man claimed he had spent $300 on service. Producing his file card, Mr. Persbacker showed him where he had actually spent $24.65 in eight years. Result—a sale of new equipment.

Each month, Automatic Equipment Co. sends a letter to each of its customers recommending purchase of new commercial equipment or additional cases or compressors. By fitting the promotion to local conditions and writing it themselves, the company's commercial department finds the mailings more than pay for their cost.

One of its largest recent installations was made in the attractive new store of the New American Coffee Co., a locally-owned food market at 541-49 Wyoming Ave. here. Using the blueprint and water-color system, the owners were sold a $22,000 installation totaling 208 feet of display cases for meats, vegetables, fruits, poultry, dairy, and other food products.

Another sale was made to Passari's market in Wilkes-Barre where $15,800 worth of equipment was installed. Here 60-ft. and 12-ft. cases were put in, together with a 12-ft. delicatessen case, a 5-ft. fish box, and a 40-ft. fish and vegetable container, all with all-porcelain shelving.

The company is pushing its sales to country-town stores, which it believes to be a very profitable market at the present time. Last month a $6,000 job was installed in a Tunkhanock, Pa., store which serves a town of only 1,200 people.

Mr. Persbacker believes that no section of the country with an equal number of stores has many display cases and other commercial refrigerator equipment installed as does the Scranton area, with a total population of 300,000, including the city's 140,000.

Replacement business, he declares, is unusually good. Most sales of cases are made after replacement of coils in units.

By starting with smaller units of sale, Automatic Equipment Co. finds its approach to larger jobs easier in the long run. Customers notice mechanical improvements and added economy, and then want to expand their equipment.

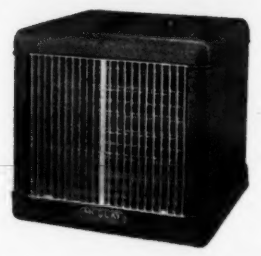
Success of the modern commercial refrigeration dealer, says Mr. Persbacker, is based on never undersizing a job under any conditions. One complaining customer can do more harm than any sales resistance over developed, he states, and profits made on undersized installations are soon eaten up in lost sales.

Often, he says, with his many foreign-born customers who love to beat a salesman at his own game, a larger job can be sold after the sale is made when they are shown what an extra ¼-hp. will mean in economy and better performance.

"To these people of Polish, Lithuanian, and Slovak extraction, one salesman's word is as good as another's—until they find out they have been gypped. Then they're done with you for good. But sell them an installation that saves them money, and they'll buy from you always," he declared.

McQUAY

McQUAY COMFORT COOLERS



For direct expansion refrigerants; also available as combination cooling and heating units, where cold water or brine is used as the cooling medium, and where steam or hot water as the heating medium . . . The ideal simplified cooling unit . . . Precision built! Numerous sizes with capacities to fit any requirements.

WRITE for New Catalogs on McQUAY Unit Coolers, Comfort Coolers, Cabinet Concealed Radiation, Refrigeration Coils, Ice Cube Makers, Air Conditioning Coils, Blast Coils, Combination Heating and Cooling Units, Suspended and Floor Type Blower Coolers, Cabinet Floor Type Room Coolers, Etc.

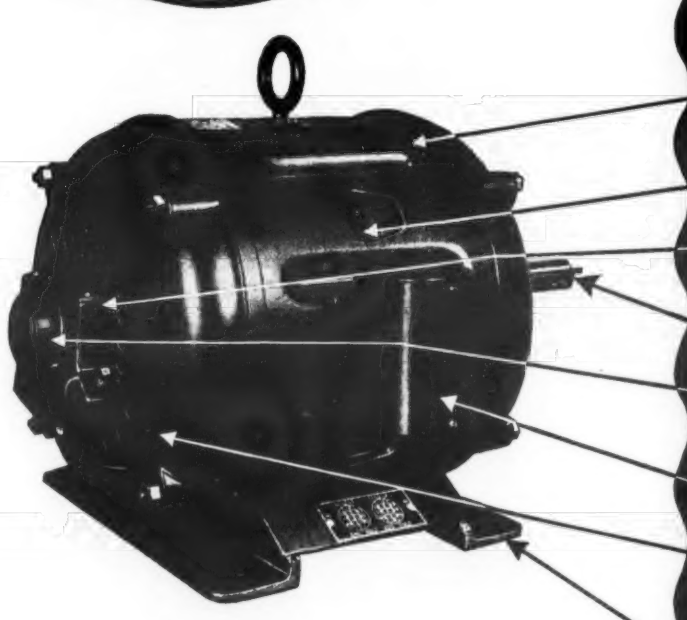
McQUAY INC.
MINNEAPOLIS MINNESOTA

WAGNER has furnished motors for air conditioning equipment for many years and has continuously improved motors for this purpose. Among the outstanding features of Wagner motors are: (1) QUIET OPERATION, (2) special operating characteristics to meet this exacting service, (3) long life, and (4) attractive appearance. As a result of Wagner's many years of experience in building motors for air conditioning equipment, Wagner motors are leaders in this field.

YOU WILL BE BETTER SATISFIED

WHEN YOU INSTALL Wagner AIR-CONDITIONER MOTORS

THEY MEET YOUR REQUIREMENTS OF PERFORMANCE AND DEPENDABILITY



A FEW OF THE POINTS OF SUPERIORITY OF WAGNER SQUIRREL-CAGE MOTORS ARE:

FRAME is fabricated from heavy steel-plate rolled into cylindrical shape and welded.

AIR-OUTLETS are extra large for unrestricted ventilation.

OIL-WELL HOUSINGS are sealed against the entrance of dirt and grit, and the escape of oil.

SHAFT is designed to carry mechanical overloads.

BEARING is steel-backed, babbitt-lined. Wagner also furnishes ball or roller bearings.

CONDUIT-BOX is mountable in four positions.

END-PLATES are liberally designed, heavy and massive, amply strong and rigid, to withstand severe service conditions.

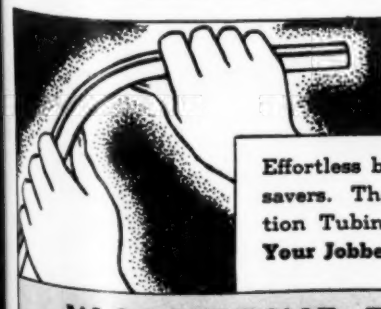
FEET are of steel, welded to the stator-frame—accurately spaced according to Wagner dimensional diagram sheets.

Regardless of your type of air-conditioning system, there is a Wagner motor ideally suited for operating it. Wagner motor are built to meet the starting and operating requirements of compressors, pumps, and air-movement devices. The Wagner line includes all types of motors generally applied on air-conditioning machinery, making it possible for you to completely equip your apparatus with Wagner motors. Whether alternating or direct current; single or poly-phase; open, drip-proof, or totally-enclosed; rigid or resilient-mounted—there's a Wagner motor now in existence, ready to be applied on the job.

Many other features of Wagner motors are worth investigating. Write today for Bulletin 182 which describes the Wagner motors that are Second-to-None for air conditioning.

ML 337-3M

Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, U.S.A.
MOTORS • TRANSFORMERS • FANS • BRAKES



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1481 CENTRAL, DETROIT Sales offices in major cities

AIR CONDITIONING AND REFRIGERATION NEWS

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JULY 7, 1937

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The arch enemies of society are those who know better but by indirection, misstatement, understatement and slander, seek to accomplish their concealed purposes or to gain profit of some sort by misleading the public.—Chief Justice Charles Evans Hughes.

New Uses for Associations

GROWTH of dealer associations has not been confined to mere multiplication of numbers and cities. In what is perhaps the outstanding development of 1937 in appliance merchandising, dealer bodies have taken on more and more duties and responsibilities, until today they are saving money and making money for their members—instead of merely policing the membership.

For example, some dealer associations have found that they can help members train salesmen. Initial part of any sales training program is a course in the fundamentals of refrigeration. Second part is a course in the fundamentals of salesmanship. Third portion is the competitive sales story—special features, superiority of design and performance, etc.—of the particular make of product they are to sell.

Cooperative Sales Training Reduces Costs and Turnover

Considerable time, effort, and money can be saved, it has been found, if the first two parts of the training as outlined above are directed by instructors in a central school sponsored by the association. Moreover, better training generally results, for better instructors can be hired—and kept busy continuously—where the cost is shared by a number of dealers.

Elucidation of the competitive sales story, of course, must be reserved for each individual dealer.

Another valuable service being offered by a few associations is that of developing lists. Most important, and most neglected, part of any direct mail campaign is an up-to-date list of prospects. Working as a central clearing house for names, in addition to developing such lists by systematic study of the city, an association can often perform a distinct service in making up and continually checking lists of prospects.

Pooling Credit Information Spots Bad Risks for Dealers

Credit information on prospects can also be compiled by associations, with resultant saving to dealers and finance companies. Occasionally it has been found that unscrupulous families have provided themselves with refrigeration for a considerable period of time by having installed a series of different makes, each of which is eventually repossessed. Pooling of information on bad risks prevents situations like this from arising.

Central Exhibit of Products Lures Wary Prospects

Led by the Cleveland association, some dealer groups have found it profitable promotion to provide a central display of their products at association headquarters. Here they can place their products in highly attractive settings in a beautiful showroom, often centrally located.

No active selling is permitted in this cooperative exhibit, but prospect names can, of course, be picked up there. Knowing that they won't be subjected to sales talks, people will come in freely and examine latest models. Thus their desire for these products is whetted, and dealers and salesmen can later follow up with considerably less sales resistance.

In conjunction with centralized cooperative displays, the dealer association can sponsor luncheons and home economics schools for women's clubs. Bridge parties and entertainments of all sorts can be provided for prospects at a low cost in this manner. Essential part of every program, of course, is a presentation of the advantages of the various appliances. And the women can examine them at their will.

Associations Best Defense Against Adverse Legislation

Local legislation sometimes turns out to be bothersome to dealers. Ordinances regulating installation can handicap an entire group of dealers, and often such ordinances are hastily passed and based on insufficient or inaccurate information.

Competitive quarrels frequently lead to conflicting testimony before city councils or other legislative bodies, and so the acts which are drawn up are often inadequate, unfair, or even foolish. Dealer associations, presenting a united front, can usually provide the best and most effective defense against adverse and unfair legislation.

Continuous Promotion Sponsored by Dealer Bodies

Cooperative advertising is not a new function of dealer associations, but this year new uses for this type of promotion have been found. Chiefly these come under the category of *continuous* promotion, as distinguished from the spasmodic campaigns staged by individual dealers.

It has been found, also, that public utilities often confine their promotion of appliances to those new products which are deemed to be in the pioneering stage. Dealer associations can provide promotion of the older, better known appliances which are the break-and-butter of the dealers' business, but which are sometimes neglected because it is assumed that everybody knows about them.

Clean Competition Prevents Customer Irritation

The cleaning up of bad competitive situations, of course, is still the first function of dealer associations. Such work has proceeded apace this year, with signal results.

Especially significant are the reports of dealers who have found that the clean competition fostered by associations has appreciably reduced consumer befuddlement and irritation with regard to sales effort.

But constructive cooperative efforts of associations, along some of the lines indicated above, are assuming more and more importance; and will likely soon overshadow the policing duties of such bodies. Associations new in the field, which as yet have not progressed far enough to embody some of these advanced practices in their programs, will do well to study the results some of their contemporaries are getting with these types of activity.

QUOTED

A Challenge to Your Future Existence

It's paradoxical, but the democracy in which we of this nation take such pride . . . for which thousands have fought and died for more than a hundred and fifty years . . . is based on a class system. On the Right is Capital; on the Left is Labor. And in between is the great middle class—the very keystone of the democratic structure. It is composed of small businesses; small industries. Individually insignificant; when taken together and acting unitedly, they represent the real America . . . the true democracy.

Laundries—whether large or small—fall into the middle class. Organized into an industry, they still remain middle class, along with hundreds of other businesses in various types of industries in this country.

Rising economic tides threaten this middle class . . . threaten each and every small enterprise which is a part of the whole . . . in every section, whether it is industrial, agricultural, or marine.

The middle class literally is "caught in the middle." On the one side is the rising tide of labor difficulties and the coming of collective bargaining, on the other is government encroachment, minimum wage legislation and Social Security.

Caught in the middle . . . in imminent danger of being crushed between the Right and the Left.

How are we of the middle class to stand against this present situation? More specifically, how are laundries to meet the serious problems facing them in an era of rising costs?

We are not like the firmly entrenched basic industries such as steel and utilities. If steel, for example, must meet Labor's demand, they simply raise the price of steel to take care of it. A large motor car manufacturer either can raise the price of his product or take his increased cost out of a considerable cushion of profit.

Laundries have no such means of meeting this condition. We do not have a cushion of profit, nor can we raise the price level much. Laundry service cannot go beyond a certain price level or volume disappears. As Stanley Brock says, *we must not forget that our customers are our competitors.* Families of the working class can—and will—do their own washing; those of the higher class can take on another maid.

Yet—if by excessive government intervention from one direction, such as we have been getting in the regulation of business and prices, and by excessive labor demands from another direction, we are thwarted and make an even smaller profit than we are making now, we gradually will be liquidated and crushed out of existence. And the same thing that applies to us applies to the hundreds of other businesses in the middle class.

It is easy to see what has happened to the countries in which the middle class has been eliminated. They are, definitely, the unhappy countries; they do not have our democratic institutions which are dependent upon civil and political liberty.

Where there is an extreme Right or an extreme Left there is not an economic liberty so that by observance of the old copy-book maxims—exercise of intelligence and application of energy—we and our children can advance from the ordinary working group upward.

If this hope and freedom of action are crushed out and the middle class is destroyed, then we will have *two* ruling classes. And if that happens, where else can we turn except to the Left—to the side of the working man? For despite the size of our laundries, we are not—and are a long way from becoming—basically entrenched capitalists.

At the present time, fortunately, there are sufficient independent industries such as our own, that have the physical number, brains and money, so that—if organized—they could give expression to their real passion for democracy and free institutions . . . continue to indulge in "life, liberty and pursuit of happiness." It still is not too late.

But we all must be made to appreciate more definitely that which we hold, and become more acutely aware of the danger before us. We must not be blind to these two tremendous forces that move inexorably in on us: the extreme governmental force from the Right, and the Labor force from the Left.

We ourselves must fight, and urge our fellow middle classmen to fight as well, for the preservation of the middle class which always has stood for the democratic institutions that have made America the land of the free.

This may be a feeble wail in a howling storm . . . it may be beating the alarm with broken reeds. The hope is that it will impel action—not only in this field but in all others of the middle class. Action is imperative; reading alone is not sufficient if we are going to maintain our identity in this changing economic world.

The middle class businessmen of this country can exercise a tremendous force if they will act in unison. Don't stand back and wait for someone else to start the ball rolling . . . we have all kinds of blocs in Washington—Labor blocs . . . veteran blocs . . . W.P.A. blocs. Why not start a middle class business bloc?

If properly organized, it would have more influence than all the other blocs put together! Get your business associates together. Let this industry assume the lead.

It would be progressive as well as protective.—*Starchroom Journal.*

LETTERS

Sorry, but the Figures Are Not Available

Outdoor Advertising, Inc.
Lincoln Building
60 East 42nd St., New York City
July 2, 1937.

Editor:

Could you furnish us with figures indicating the leading three manufacturers of electric refrigerators in years from 1927 through 1936, and the number of units produced annually from 1927 on by each of these three companies?

T. E. BEEHAN.

Answer: See below.

Pittsburgh Plate Glass Co.
Grant Building, Pittsburgh, Pa.
June 26, 1937.

Editor:

I have searched each issue of your excellent publication when received with the hope I could obtain figures, as is possible in the automobile magazines, showing the production or sales of refrigerators by the various well known manufacturers.

Possibly you publish such information at certain periods. At any rate, I would like to have, if possible, figures showing the production and sale of refrigerators by the 10 leading manufacturers during the year 1936 and this year to date. I hope you can furnish.

FRANK W. JUDSON,
Vice President.

Answer: We receive a great number of inquiries on this question of the sales figures and "ranking" by companies, and our stock answer is that we cannot furnish official data because the principal companies do not release information regarding their production or sales *for publication.*

They do turn in their figures each month to the statistical department of National Electrical Manufacturers Association (Nema), but the individual returns are zealously guarded and only the *totals* for the entire group are released. The totals (classified by types and sizes of equipment) are published each month in the NEWS.

Now and then we do occasionally learn about the sales records of some companies and we manage to get a pretty good idea of the relative standing of the leaders from piecing together the bits of information gleaned from a variety of sources. This knowledge is often *reflected* in the news columns, and regular readers of the paper should have no difficulty in figuring out rough approximations of the progress being made by the various companies.

Some inquirers make reference to the fact that some of the trade periodicals in the automobile field regularly publish figures on the sales and production of the individual manufacturers, but such writers obviously haven't given any thought to the fact that the required registration of all automobiles for license purposes makes the figures on the number of each make sold a matter of public record.

Determining Year from Model Number

Modern Homes Appliance Co.
36 Lowell St., Manchester, N. H.
July 3, 1937.

Editor:

Do you have or can you refer me to where I can obtain a cross-index whereby one could determine from the model number of any of the popular makes of refrigerators and the year of its manufacture?

M. M. LEVITT, Manager.

Answer: The REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS BOOK contains the model numbers of all models of all makes of refrigerators by year of manufacture, together, in many cases, with the compressor model number. This book sells for $3.00 per copy.

Thanks from Mr. Hallstrom

E. Hallstrom
Refrigerator Manufacturer
Kerosene Operated
462-464 Willoughby Road
Willoughby, Sydney, Australia
7th June, 1937.

Editor:

Mr. Hallstrom, who disembarked from *S.S. Aorangi* this morning, directed that we indicate to your goodself his appreciation of the courtesies and assistance afforded him during his visit to the United States of America. He will continue to entertain the happiest recollections of what was one of the most pleasant episodes of his sojourn in your great country.

We trust that should you at any time visit Sydney we will be privileged to reciprocate your hospitality.

Had urgent matters not necessitated Mr. Hallstrom's temporary absence from his headquarters he would, of course, have conveyed his gratitude in a personal letter, a pleasure of which he will avail himself as soon as possible.

A. REGINALD WARD.

Add Publisher's Problems

Martin Ribalta Urpi
Mallorca, 304
Barcelona, Spain

Sirs:

Have received the bill of subscription to your interesting review AIR CONDITIONING AND REFRIGERATION NEWS for 1937 but, due to the present circumstances in Spain it is not possible for me to remit you the amount of the subscription, because our authorities forbide us to accomplish drafts on any class of foreign money.

This is why; being interested refrigeration business, with the exclusivity of Norge in Spain, I must beg you to continue on sending me your important review and the last of your books published by you too, that is to say REFRIGERATION ENGINEER'S MANUAL vol. 5, and the volumes 6, 7, and 8 whenever you have them published.

The total amount of it will be remitted to you as soon as the circumstances will allow me to do it.

HIJO DE J. RIBALTA.

Suggests Editor Tour The 48 States

Fedders Manufacturing Co., Inc.
Buffalo, N. Y.

Editor:

It is indeed with great regret that we note that your series of travel articles are concluded.

Would suggest that you visit the 48 states and give us your reaction in the same style as you have done with the 33 foreign countries.

E. B. RIKLIN,
Assistant to Factory Manager.

THE AIR AGE

BY F. O. JORDAN

Improving on Nature

There is an old saying to the effect that "you can't improve on Nature," yet the whole history of Man's progress disproves the statement. Attempts to improve on Nature have always been and still are the basis of practically every form of human activity.

Ever since the first man shivered naked in a chill morning breeze and gooseflesh first appear on human skin, the human animal has felt the need for "improvement."

To protect himself from cold, Man eventually wrapped some sort of insulating material about him. We can imagine him grinning with pleasure at the success of what may have been improvement Number One.

Later he learned how to protect himself from rain, hail, and snow by constructing shelter.

Any line of human activity will furnish examples of improvement on Nature. Transportation, for example, has progressed from the plain use of Nature's gift, our legs, to airplanes that, literally, can travel "faster than the wind." And Man can even sleep as he goes.

Man's control over his own comfort so far at temperature, humidity, and air cleanliness are concerned, had shown little progress until quite recently.

Though surrounded by modern luxuries, man loads up his Nature-given lungs and clean white shirts with tons of the soot, grime, and virulent bacteria found in Nature's free air. His body and spirit sags from searing heat and dripping humidity during summer days and nights.

EFFECT ON HEALTH

Not only is control of the atmosphere one lives in a matter of comfort, it actually has proven to be a matter of life and death. In hundreds of thousands of cases, premature death has come, directly or indirectly, because of mid-summer heat.

Air conditioning was used in a crude form in ancient times by certain rich men who made sweating slaves stand beside them all night and wave huge fans.

More recent times have produced the electric fan. It brought a measure of relief by increasing the rate at which perspiration evaporates. Since evaporation is a process that uses up heat, more evaporation means the using up of more heat. And the more heat used up in any one place, the cooler that place is.

The trouble with the fan is that it is useless until after a man begins to perspire, there being nothing to evaporate until then. And a man doesn't begin to perspire until he is already too warm for comfort. The fan, therefore, does not keep one from getting uncomfortably warm, though it tends to reduce discomfort after one has already become uncomfortable.

Elaborating on the fan idea, Man discovered that he could improve on Nature's weather still more by installing a huge fan in the attic. This fan sucks the night air in through the bedroom window, then from the bedroom to the attic, and finally blows the used air back into the night.

This arrangement is quite satisfactory provided that: upwards of 30 air changes take place in the room every hour, that the night air itself is not too hot to do its cooling job, and that one is satisfied with the dirt, dust, noise, etc., which are brought in through the open window by such large volumes of fast-moving and raw outdoor air.

ALL-YEAR COMFORT

Then came true air conditioning with its life-saving, all-year comfort. Man now has at his command pleasant warmth for winter and soothing coolness for summer. And he can shut himself away from the jarring noise and the noisome grime of the outdoors.

As if in celebration of Man's growing release from Nature's age-long oppression, great buildings are now constructed with no windows whatsoever. In this way, not only is Nature's idea of weather completely banished from their interiors, but views of unlovely surroundings are shut out.

Only objection to this arrangement is said to be that the fortunate occupants never know just how lucky they are. They do not have even a dirty window to remind them of how unpleasant Nature's current mood may be.

Opportunities for Real Trained Men

"The rapid growth of the (air-conditioning) industry will absorb every technically qualified man the colleges and universities can provide during the next few years," declares E. L. Sylvester, residential air-conditioning sales manager of Nash-Kelvinator Corp.

Notice that Mr. Sylvester does not say that the air-conditioning industry will absorb every man turned out by the air-conditioning schools, but that every **technically qualified** man will get a job.

This point is restated because the aspirant to a good job in the world's most rapidly growing industry owes it to himself to look over pretty carefully the air-conditioning course offered by any school before he matriculates and forks over his hard-earned money.

There are many courses to which "air-conditioning" is prefixed only for want of a better name, and the "hard-boiled" employer is not going to get excited by a gilt-edged "Air Conditioning" emblazoned across the front of your diploma. He has been fooled before.

On a recent trip taken for AIR CONDITIONING AND REFRIGERATION NEWS, we made a point of asking department heads of practically every large air-conditioning factory along the Atlantic seaboard about this training question.

Every man of them declared the shortage of trained men to be a serious problem, requiring satisfactory solution before the industry can enjoy any considerable degree of expansion.

GOOD COURSES RARE

But most of them insisted that the average air-conditioning course given today is not worth the powder to blow it to pieces, because its graduates do not have even a talking knowledge of modern air-conditioning practice, much less the ability to **think** in its terms.

Therefore, you young and hopeful, do not hand the man your money until he has convinced you that his alleged air-conditioning course can qualify you technically for the common everyday chores which confront practical air-conditioning engineers.

A good course does not merely ramble on about psychrometric relationships and Charles law. Ask the salesman whether you will learn how to figure the roof sunload and the sun effect on the west wall, when the lag of each is six hours and the occupancy load peaks at 6 p.m.

But all of the executives interviewed admitted that one type of course—one which would really pretrain their new recruits in the useful fundamentals and practical applications of air conditioning and refrigeration—would be a wonderful help to their respective concerns.

NO OVERSUPPLY DANGER

The sentence already quoted from Mr. Sylvester speaks of the man-absorbing capacity of the industry. Continuing on this topic, he says:

"Despite the increasing number of educational institutions offering air-conditioning courses, I feel safe in predicting that it will be at least several years before the supply of trained men catches up with demand.

"Public demand for air conditioning is growing rapidly. A recent survey of 11,000 present and prospective home builders showed that 30% 'must have' and 65% 'would like' air conditioning, a potential market of 90% of new homes.

"Equipment installed during 1936 was valued at $52,500,000," says Mr. Sylvester, "and estimates indicate a 60% increase to $85,000,000 in 1937. Such developments as the Kelvin Home movement, providing completely air-conditioned homes for families of moderate income, are beginning to dominate the market, and the building boom just beginning should account for much of the increased business.

"Commercial installations, too, are increasing steadily. All in all, the air-conditioning field offers an attractive future to the engineering student."

Think it over, for here is a real opportunity to raise your pay without sitting down with the C.I.O.

25 Engineers Selected For Training Course At Trane Factory

LA CROSSE, Wis. — From the largest group of applicants ever received, 25 graduate engineers have been selected by Trane Co., manufacturer of heating, cooling, and air-conditioning equipment, to participate in its annual training course.

During this six-month course, students are to receive training under the guidance of each department manager. Technical instruction is to be supplemented by actual factory work. To round out their training, student engineers will be assigned to contractors doing actual installation work in this territory.

Although the primary purpose of the course is to prepare men for sales work, each student will be under close observation throughout the training period to determine any particular aptitude for departmental work.

"Refrigeration? You couldn't sell us anything BUT Copeland. My own experience has shown me which is the best."

Hotels, restaurants, soda fountains, dairies—wherever economical, trouble-free refrigeration is vital, you'll find Copeland enthusiasts.

Write for our S. ss Plan

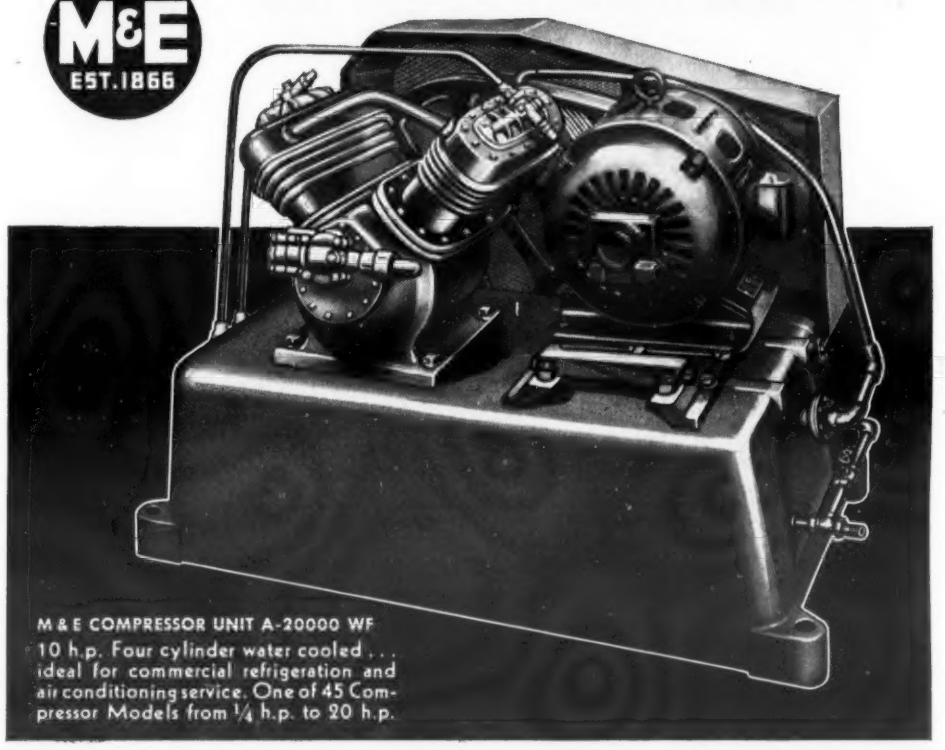
COPELAND

REFRIGERATION CORPORATION . . . DETROIT, MICHIGAN

M&E PIONEERED

AUTOMATIC REGULATION OF BELT TENSION . .

M&E EST. 1866



M & E COMPRESSOR UNIT A-20000 WF
10 h.p. Four cylinder water cooled . . . ideal for commercial refrigeration and air conditioning service. One of 45 Compressor Models from ¼ h.p. to 20 h.p.

Watch an M & E Compressor Unit Motor lean into the starting torque when the switch clicks on—exerting maximum tension to prevent slippage, wear and burning of the belt.

Now—see it ease up as the compressor speeds up—floating on the belt with minimum tension to let the belt recover its elasticity, to reduce wear on belt and bearings, and to save power.

Here is your opportunity to end belt and bearing troubles on heavy duty compressor units. Specify M & E for the plus values in Refrigeration.

MERCHANT & EVANS CO.
Phila., Pa., U. S. A. — Plant at Lancaster, Pa.

MERCHANT & EVANS
FOR THE *Plus Values* IN REFRIGERATION

THE TWELFTH SUCCESSFUL YEAR IN ELECTRIC REFRIGERATION

TEMPRITE
INSTANTANEOUS
BEER and WATER COOLERS
Detroit Michigan

CHASE HEAT QUICKLY BY USING Artic
REG U S PAT OFF.
(DU PONT METHYL CHLORIDE)
rapid production of ice cream and frozen desserts

HIGH latent heat of ARTIC and other valuable thermodynamic properties contribute toward the quick freezing and quick cooling so essential for production and preservation of dairy products.

DU PONT

E. I. du Pont de Nemours & Co., Inc.
The R. & H. Chemicals Dept.
Wilmington, Del.
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ARTIC-*the preferred Methyl Chloride for Service Work*

How to Select and Install Air Conditioning Systems

CASE NO. 22

Indirect System In a Store

BY T. H. MABLEY

Case No. 21 illustrated the use of an indirect system of air conditioning where water coils were used for both heating and cooling the air passed through the various units.

Let us now consider another type of indirect system employing a central unit and an air washer and steam heating coils instead of water coils.

The performance of these two types of systems is substantially the same, but for various reasons one may be preferred to the other for some particular application.

The present problem involves the air conditioning of the first floor of a department store. The space is located in a large building surrounded by other buildings on two sides and exposed in the front and rear. The basement of the building is used for stock space and the second floor for sales space.

SHAPE OF SPACE

The sales floor which occupies almost the entire first floor is regular in shape, being cut up only by two rows of supporting columns. The ceiling beams and all piping on the ceiling are concealed by a false ceiling.

The purchaser of the proposed system intends to supply the store with equipment to provide all the major functions of a complete year-around air-conditioning system. In other words we shall be concerned with control of the temperature, the humidity, circulation, and filtration of the air to at least some limited degree.

For comfortable conditions in the summer time we will endeavor to maintain an inside condition of 78° and 50% relative humidity in the conditioned area. This condition is based upon the outside design temperatures of 93° dry bulb and 75° wet bulb. As the outside condition falls below this maximum the inside temperatures will be reduced in a sliding scale ratio.

LOAD DATA

The heat load calculations must take into consideration the estimated occupancy of 300 persons, and the internal light load of 18,000 watts. By the usual method of calculations illustrated in many of the previous cases we find that the total amounts to 31.6 tons.

Included in this load are approximately eight tons of fresh air load based on 3,000 c.f.m. of fresh air. The volume of fresh air was determined both by the estimated infiltration and the occupancy load.

With the load data in hand we can proceed with the selection of the equipment for the proposed system. It so happens that we have available in the basement of the building an abandoned air washer system. This was one of the deciding factors in the choice of this equipment.

A further advantage to the use of the air washer is its use as an aid to the filters in the removal of dust and lint so prevalent in this particular case. The present system is slightly larger than may be required, but this will be an advantage rather than a hindrance.

The present system was designed to handle approximately 20,000 c.f.m., but for our particular purpose we will use a smaller quantity of air.

AIR REQUIREMENTS

The internal sensible heat gain in the store has been calculated to be about 19.1 tons. This means that if we introduce the conditioned air into the store space at a temperature about 15° below room temperature, about 12,500 c.f.m. will be required to be handled by the system.

Thus we will introduce this quantity of air at a temperature of 63° to provide the necessary cooling effect. This same quantity will be ample for any necessary ventilation or heating required of the system and will provide the minimum recommended number of air changes.

The speed of the present washer system blower will be reduced by means of changing the ratio of the belt-drive pulleys to a speed at which the total air volume of 12,500 c.f.m. may be handled through the system.

DUCT SYSTEM

The duct system will be rather simple but effective in design. A main supply duct, hung from the ceiling and mounted flush to the ceiling will run the length of the store.

The supply riser will be split and brought up in two branches on either side of the stairway. This will be done to maintain a symmetrical appearance and to reduce the usable floor area taken up by a single riser.

In order to reduce the size of furring required to conceal the supply ducts, a system of deflector vanes will be used in all elbows and the elbow fittings themselves will be made square.

This design of sheet metal construction has been proved to be very satisfactory if care is taken to install the proper number and type of deflecting vanes. Data on the subject is now available in many technical books and manufacturer's data sheets. By eliminating the long sweep elbows of the conventional type, the furring to be installed around the ductwork may be kept very close to the sides of the sheet metal supply ducts.

SUPPLY GRILLES

Supply grilles of the diffusing type will be installed in outlets located between each of the columns. These outlets designed for high velocity discharge should be ample to give proper distribution in all portions of the conditioned space with the possible exception of the area directly under the supply main.

For this very reason we will install some small and narrow grilles having a multi-directional discharge in the bottom of the supply trunk. These grilles will not carry a large volume of air—just enough to eliminate the possible danger of air stagnation or insufficient cooling effect in the very center of the store.

While it is true that there is a current of air in this area due to the aspirating effect from the high velocity discharge of air at the supply outlets, the air circulation is usually insufficient to offset the heat gain concentrated at the center of the store.

EQUIPMENT NEEDED

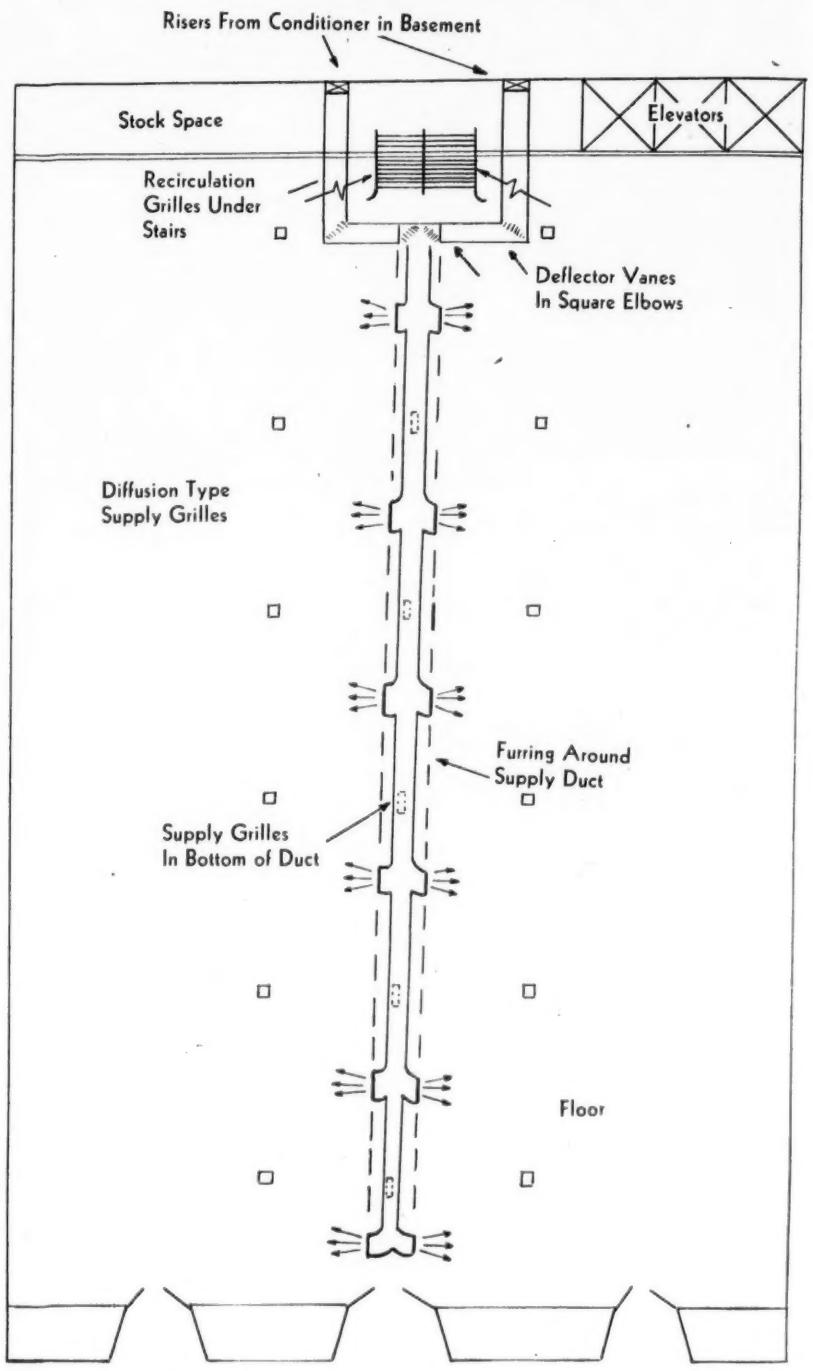
Equipment for the system will consist primarily of the air washer, a water cooler, and a refrigeration compressor. The present air washer will be revamped to handle the necessary volume of air. The accessories for this unit shall consist of a double row of heating coils for preheating, a bank of reheating coils, a bank of washable filters designed for wet operation, the proper spray headers, eliminator plates, a water-circulating pump, and of course, a centrifugal blower.

The fresh air will first be brought through the pre-heater coils which will temper the air to room temperature. These coils are divided into two banks. The first bank is controlled by an outdoor thermostat in such a manner as to keep steam supplied to the coil at all times when the outside temperature is below 35° F.

The steam supply to the second coil will be controlled by a motor-operated valve which is regulated from a temperature control in the discharge duct leading from the conditioner. The reheat coil is used to supply heat to the conditioned air when necessary, and thus the steam supply is controlled by the thermostat located on the first floor near the return grille.

(Concluded on Page 15, Column 1)

Fig. 1—Indirect System on First Floor Of a Department Store



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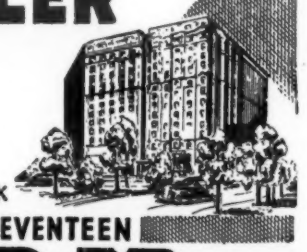

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Practical Installation Articles for the Air-Conditioning Distributor-Contractor

This series of articles on "How to Select and Install Air Conditioning Systems" by T. H. Mabley, chief engineer of Mechanical Heat & Cold, Inc., Detroit air-conditioning distributor, is written for the use of the air-conditioning distributor and contractor in solving problems of equipment design and installation. As such it should be particularly valuable to new distributors in meeting field problems.

Each study includes an illustration of the method of making the installation, and in some cases, tables to be used in figuring the load requirements or some other factor for the specific job.

In some instalments Mr. Mabley goes into considerable detail in explaining how the heat load calculations are actually figured, how the duct areas are estimated, how refrigerant lines are sized, etc.

Case No. 22 which appears on this page discusses the methods for solving problems involved in making a year-around air-conditioning installation on the first floor of a department store, using the indirect system of cooling.

Compilation of Mr. Mabley's articles into a pamphlet for ready use by an air-conditioning contractor or dealer is being started by the NEWS. Announcement will be made in the NEWS as soon as these pamphlets are ready for distribution.

The case studies which have appeared in AIR CONDITIONING AND REFRIGERATION NEWS are:

Case No. 1, A Single Office (Jan. 6); No. 2, A Conference Room (Jan. 13); No. 3, Residence System with Room Cabinets (Jan. 20); No. 4, Typical Commercial Application — A Shoe Store (Feb. 3).

Case No. 5, A Beauty Parlor (Feb. 24); No. 6, A Small Coffee Shop (March 3); No. 7, A Process Job (March 10); No. 8, A Doctor's Office Suite (March 17); No. 9, Central System for a Group of Offices (March 31).

Case No. 10, Partial System for a Residence (April 7); No. 11, Upper Floor of a Residence (April 14); No. 12, A Men's Apparel Store (April 21); No. 13, A Women's Dress Shop (April 28); No. 14, Dual System in a Restaurant and Cocktail Bar (May 5).

Case No. 15, Complete System for a Residence (May 12); No. 16, An Auditorium or Small Theater (May 19); No. 17, Single Floor in a Wing of a Factory (May 26); No. 18, Basement of a Store (June 2; No. 19, A Group of Offices, including one large office and several private offices (June 9).

Case No. 20, A Haberdashery (June 23); and Case No. 21, Indirect System for a Suite of Offices (June 30).

Controls for Indirect Air Conditioning Installation

(Concluded from Page 14, Column 5)

Heating of the sales floor is supplemented by means of steam radiation at the front entrances. This serves the purpose of reducing cold drafts entering front of the store.

The cooling equipment is controlled by the cooling thermostat which controls the operation of the refrigeration compressor. The compressor is selected on the basis of having the required 31.6 tons of refrigeration output at 35° F. refrigerant temperature. The water cooler is selected to cool water from 52° to 44° when connected to this compressor.

The water pump will be used to circulate the water from the washer through the cooler and then to the spray header. An overflow and a make-up float feed will be installed in the washer for both winter and summer operation.

The pump will be controlled by the cooling cycle in the summer time and by the humidistat in the winter. The wet-type filter will serve as an eliminator as well as an air filter. The constant flow of water across the face of the filter will serve to keep it clean during most of the time; however, there will be some periods when the sprays may not operate often enough to keep the filters clean and they will have to be cleaned manually. The water strainer actually will require the most attention.

While the air washer is not used so frequently now as during the earlier years of air conditioning, there may be many cases in the future where this type of equipment or similar equipment will be used for air conditioning.

Some of the methods for dehumidification now being used on the most up-to-date systems employ a flow of liquid through the air chamber and developments are in progress with the use of odorless and non-toxic chemicals which may be introduced into the spray water to improve the air conditions.

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JACKSON, Mich.—McCleery Sheet Metal Works has been appointed dealer for Airtemp air-conditioning systems.

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Portable Cooler Show Held in Oklahoma City

OKLAHOMA CITY—The first annual Electric Portable Air-Conditioning Show, held here recently on the ground floor of the Insurance building, was similar to the annual show sponsored by Oklahoma Gas & Electric Co. on behalf of electric refrigeration dealers and distributors here.

Companies participating in the show included: Richards & Conover Hardware Co., Kelvinator; Brown Electric Co., Norge; Howard E. Melton, Inc., Delco-Frigidaire; Southwest Airtemp Corp., Chrysler Airtemp; Hales-Mullaly, Inc., York; Oklahoma Electrical Supply Co., Carrier; Albert Ahrens Co., Atlas; Tom Dolan Heating Co., Westinghouse.

BOOKS AVAILABLE

(Send order for these books with cash remittance to Business News Publishing Co., 5229 Cass Ave., Detroit, Mich. For foreign mailing, please add 50 cents to the total amount of the order to cover postage and packing.)

THE MASTER SERVICE MANUALS

The Master Service Manual by K. M. Newcum, known to service men as the book that gives the "What to do" and "How to do it" for all types of household refrigeration systems, has just been revised by the author and has been split up into three smaller "Manuals."

Manual No. 1 includes the chapters on the theory and principles of refrigeration, the chapters outlining the characteristics of refrigerants, and the chapters describing the construction and operation of condensing units, evaporators, controls, and motors. Price, $1 a copy.

Manual No. 2 describes the installation methods, service complaints, and service remedies for each of the common types of household refrigeration systems. A step-by-step outline of the various service operations is given. Price, $1 a copy.

Manual No. 3 gives specific service instructions for certain makes of refrigerators no longer being manufactured, which are of such design that special service instructions are necessary. Price, $1 a copy.

REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS

The first comprehensive compilation of key specifications for all models and makes of household and commercial refrigeration equipment and air conditioners through 1936.

This 512-page book was designed primarily for the use of service men in identifying operating characteristics and specifying replacement parts.

For example, it offers such pertinent data as the oil and refrigerant charge, belt size, and compressor model number. Then it also tells the make and type of such component parts as controls, motor, evaporator, and condenser.

The book will also prove valuable to dealers and salesmen in establishing trade-in values on used electric refrigerators.

In addition to the specifications of all models of all makes the Refrigeration and Air Conditioning Specifications Book offers a brief corporate history of all companies that have manufactured electric refrigeration equipment. Price of the book, $3 per copy.

THE REFRIGERATION ENGINEER'S MANUAL

The Refrigeration Engineer's Manual, written by S. L. Potts, is a guide for the installer and operator of large-size refrigeration systems for industrial-type applications. It covers the selection, installation, and maintenance of all types of systems, and explains how to figure the sizes and capacities of various systems.

More than 100 diagrams and pictures are used to give the reader a thorough understanding of the subject. Many tables are included for handy reference purposes.

One of the most useful chapters in the book is one which lists the common service operations on the compression-type system, and describes in detail the proper methods of performing these operations.

The Refrigeration Engineer's Manual is thoroughly indexed as to subjects, definitions, formulas, illustrations, and tables, making it valuable data easily available for reference. Price, $3 per copy.

AIR CONDITIONING SURVEYS

Air Conditioning Surveys is an 84-page booklet summarizing installations of air-conditioning equipment to date in 55 U. S. trading centers. The information tabulated in this book was obtained through the cooperation of power companies that keep records on air-conditioning installations.

The information contained in the booklet tells why types of places are buying air conditioning, indicates the sales progress made in the past two years, and for a number of cities gives the name and address of the place in which each installation was made, make of equipment installed, and the size of the installation in terms of cooling capacity. Price of the booklet, 50 cents.

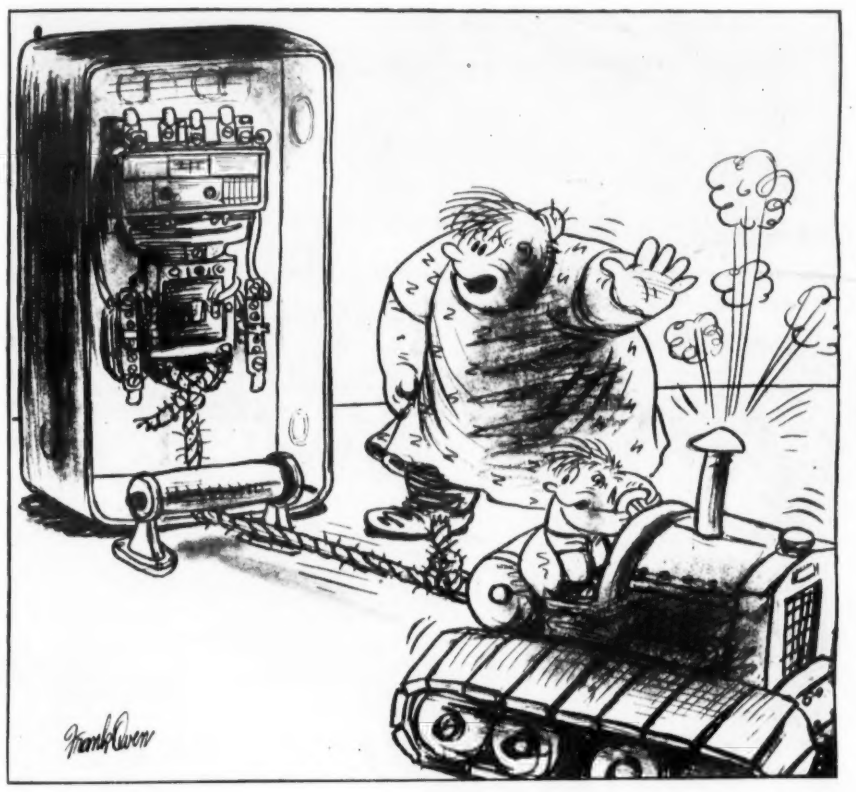
Sawade Directs Sales of Utica Air Conditioners

UTICA, N. Y.—Carl Sawade, general sales manager of Utica Radiator Corp., has also been appointed sales director of the company's new air-conditioning division, according to William C. Murray, vice president.

Dividing his time between the Utica office and the recently opened New York one, Mr. Sawade will coordinate sales of air-conditioning equipment with sales of boilers and radiators through branch offices, distributors, dealers and the time-payment department.

The new Utica air conditioner, now being introduced, is built on the "Hydro-Air" system of washed air control. A complete demonstrator installation, showing the unit in year-around operation, has been set up at the New York office.

The Utica conditioner was shown at the recent annual convention of American Medical Association at Atlantic City. Karl Walters, Minor Hughes, and Walter Sherbrooke were in charge of the exhibit.



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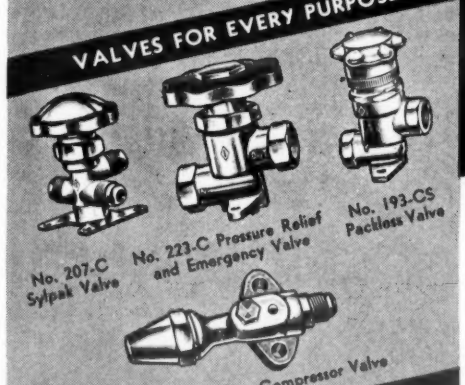
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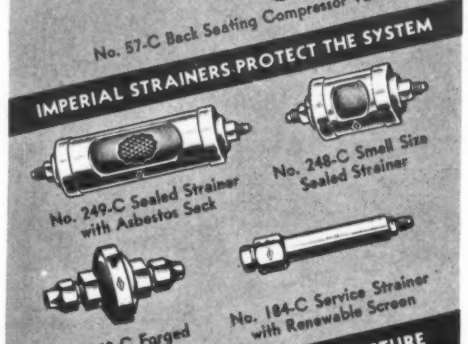
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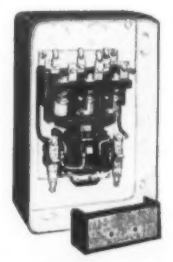

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Air Conditioning Made Easy — By J. O. Jordan

Methods of Measuring Air Flow in Test Laboratory

SECTION NO. 16 (Cont.)

Test Data

Air and Water Flow Measurements

Since the accurate measurement of air and water flow is of great importance in the testing laboratory, the subject is worthy of special mention.

Air flow may be measured in one of the following ways:

By Anemometer

1. By means of an anemometer or other type of air meter, located at an air inlet or outlet. This method generally is not considered to be accurate enough for laboratory work.

However, if the anemometer is calibrated against an accurately calibrated wind tunnel for the range of air velocities and under the actual conditions at which it is to be used, and if it is properly handled, generally satisfactory results may be obtained.

Considerable care must be taken that the instrument is calibrated under the exact conditions of the test. For example, the calibration runs must be "blow-through" or "draw-through," depending upon whether the air will be blown or drawn through the instrument during the test runs. And if tests are to be run with the anemometer adjacent to registers, filters, etc., the calibration runs must be made with the instrument in the same relationship to the same type of register, filter, etc.

This method has two advantages—it requires the minimum of equipment and is easy to use.

By Wind Tunnel

2. By means of a wind tunnel. If this method is used, an auxiliary fan must be employed for the purpose of exactly overcoming the resistance of the tunnel, so that the actual air delivery of the unit under test will be the delivery which will be obtained under field conditions.

The air flow through the wind tunnel may be determined by means of an orifice or a pitot tube. A draft gauge is used for indicating pressure drop through the orifice, or the velocity pressure shown by the pitot tube.

In the case of the orifice, the air delivery is computed from the following equation:

$$\text{C.f.m.} = 1096.5 \times CA \times \sqrt{\frac{P}{W}}$$

C.f.m.=Cubic feet of air delivered per minute.

C=Coefficient of orifice (0.6 for a sharp-edged orifice in a thin plate).

A=Area of orifice in square feet.

P=Pressure drop through orifice in inches of water as read.

W=Weight of air in pounds per cubic foot. (See Fig. 79.)

In the case of the pitot tube, the air delivery is computed from the same equation as given above for the thin-edged orifice, except that the orifice coefficient equals one, so that "C" is dropped from the equation and "P" is the velocity pressure indicated.

For standard air (.07495 lb. per cu. ft.) the equation for the pitot tube becomes:

$$\text{C.f.m.} = 4005A \times \sqrt{P}$$

When using the pitot tube, the location may, for maximum accuracy, be such that its reading is the same as the average of readings taken from a transverse of the entire duct taken at the centers of equal areas. (See Fig. 92.) Or, when extreme accuracy is not required, the tube may be located at the center of a round duct, and the pressure readings multiplied by 0.815.

When velocity pressures are measured by means of a pitot tube placed in an air stream of considerable velocity, the tendency is to indicate a velocity which is higher than the actual velocity. This is because the high velocity has an aspirating effect upon the pitot tube, causing a negative error in the static pressure effect.

This negative error, in turn, results in a positive error in the indicated velocity pressure, since the velocity pressure is the difference between the total and static pressures. For this reason it is advisable to develop a correction curve from tests in which the velocities indicated by pitot readings are checked against velocities indicated by the steam coil method explained below.

Fig. 92 shows a correction curve which has been plotted from the average results of tests run upon four representative pitot tubes. This curve was used to correct also for the specific gravity of the particular liquid used in the draft gauge during the test.

Fig. 93 shows a wind tunnel design which has proven satisfactory for use with the pitot tube.

This tunnel is provided with built-in heating coil and humidifying spray for maintaining at any desired condition the air supplied to the air-conditioning unit under test, thus obviating the necessity of maintaining the entire test room at a given definite and frequently uncomfortable condition.

Chief advantage of providing the wind tunnel with built-in heater and humidifier is that the desired condition may be accurately and easily controlled. It is practically independent of external influences; and conditions may be changed instantly, because it is not necessary to overcome the lag of the entire room in changing over from one test condition to another.

(Concluded on Page 17, Column 1)

Fig. 92—Pitot Tests

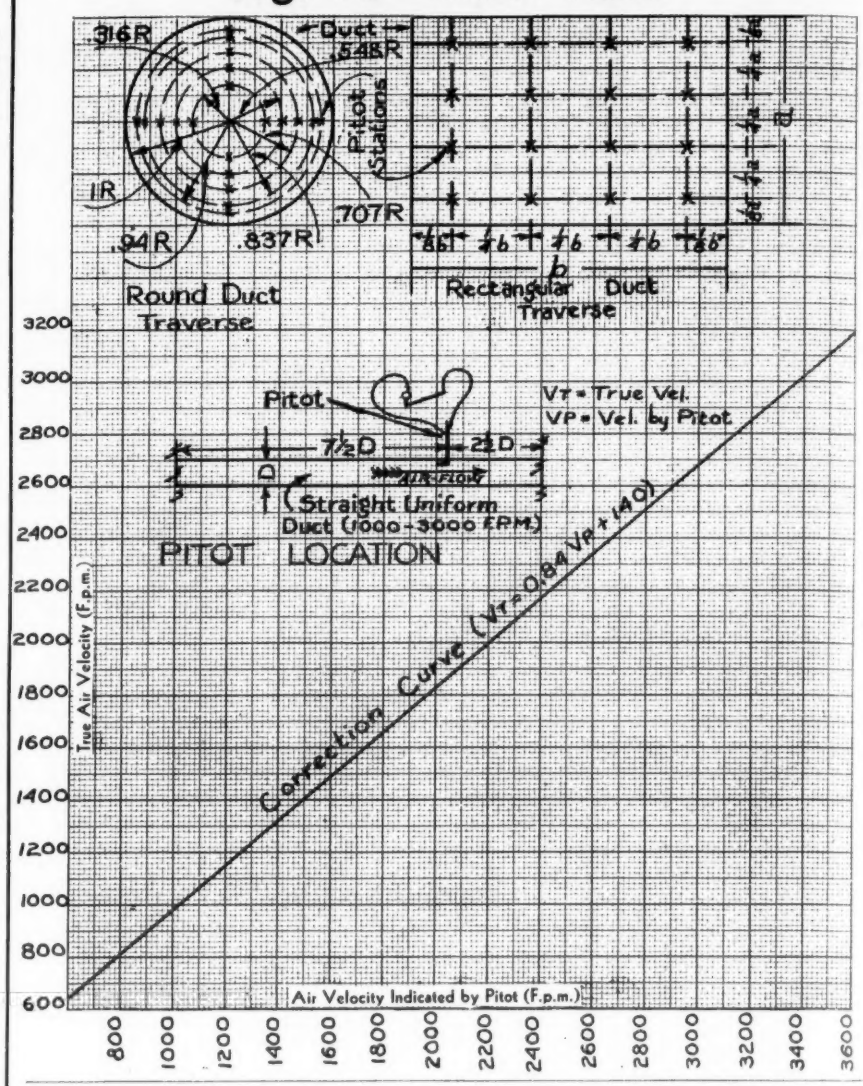
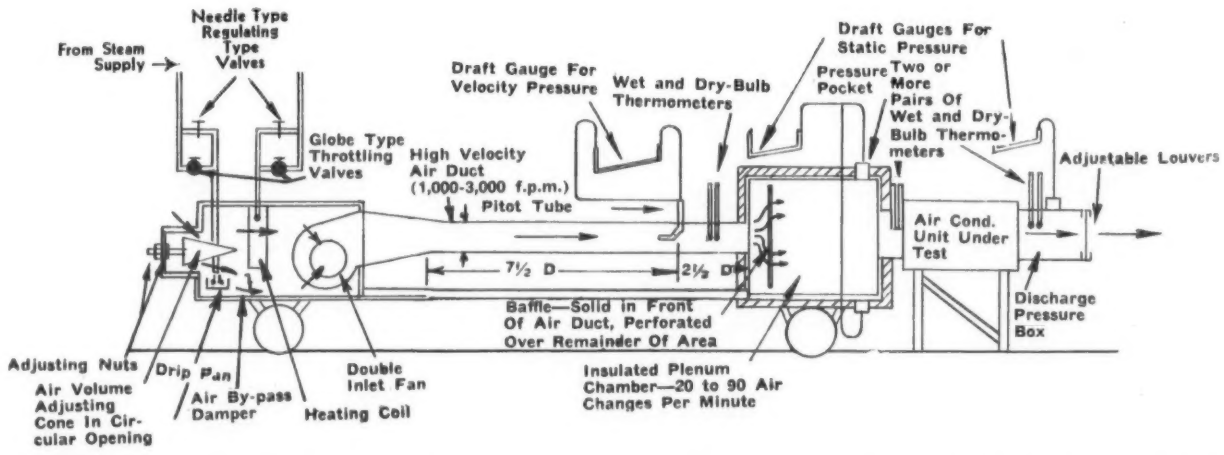


Fig. 93—Wind Tunnel Design for Use with Pitot Tube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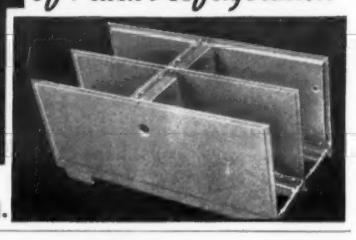

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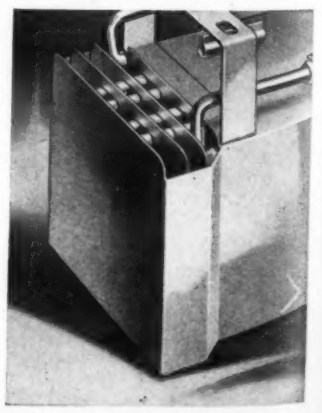

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Learn the Fundamentals Now! Read 'Air Conditioning Made Easy'

Published on this and the preceding page is a continuation of Section 16 of AIR CONDITIONING MADE EASY, a manual by F. O. Jordan, air-conditioning editor of the NEWS and former head of the air-conditioning development laboratory of the Airtemp division of Chrysler Corp. The book is being published in serial form in the weekly issues of AIR CONDITIONING AND REFRIGERATION NEWS.

AIR CONDITIONING MADE EASY is a manual and textbook on air-conditioning engineering practice. The section continued in this issue—"Test Data"—gives an indication of the wide scope of the book. It is a manual which deals not only with the engineering principles of air-conditioning and field application procedure, but also with the actual design of equipment and even the proper organization of personnel for a company getting into the field.

As such, AIR CONDITIONING MADE EASY should be widely useful to individuals already in the air-conditioning field who want to broaden their knowledge of it, to students who are intending to make air conditioning their career, and to executives of manufacturing or distributing organizations who are contemplating getting into the air-conditioning business.

The following instalments of AIR CONDITIONING MADE EASY have already been published in the NEWS:

What Is Air Conditioning?—Sept. 23.

Section 1, Introduction, and Section 2, Definitions and Simple Thermodynamics—Sept. 30.

Section 3, Coil and Water Cooler Performance—Oct. 7 and 14.

Section 4, Condensing Unit Performance—Oct. 21.

Section 5, Air Movement and Ventilation Requirements—Oct. 28.

Section 6, The Complete Air-Conditioning System for the Cooling Season—Nov. 4, 11, 18, and 25.

Section 7, Heating—Dec. 2, 9, 16, 23, 30, Jan. 6, 13, 20, 27, Feb. 3, 10, 17, 24, March 3, and 10.

Section 10, Don'ts—March 17 and 24.

Section 14, Controls and Zoning—March 31, April 7, 14, and 21.

Section 15, Design of Equipment—April 28, May 5, 12, and 19.

Section 13, Noise Control—May 26 and June 2.

Section 16, Test Data—June 9, 16, 23, and 30.

Measuring Air Movement by Use of Wind Tunnel; Steam Coil Method

(*Concluded from Page 16, Column 5*)

The success of this type of test tunnel in accurately maintaining a given test condition, for air entering the air-conditioning unit under test, depends upon keeping constant the condition and temperature of the air stream to the heater and humidifier. So this type tunnel should not be used unless a source of controllable steam supply is available.

Generally, a steam pressure regulating valve will maintain the required constancy of steam pressure.

If desired, the built-in heater and humidifier may be omitted. In that case, however, a heater and humidifier must be provided for the test room to maintain the entire room in the desired condition. This heater and humidifier should be located, preferably, in the blast of air which is discharged from the unit under test, in order to obtain thorough mixing of air and prevent objectionable stratification within the test room.

With the tunnel as shown by Fig. 93, the air flow is governed by the position of the air volume adjusting cone as regulated by the thumb nut. The use of a multi-speed or a variable speed motor is also of assistance in governing air flow.

When an air-conditioning unit is under test as shown by the sketch, the usual procedure is to place it under normal operation, and to regulate the wind tunnel fan speed and/or the position of the air volume adjusting cone so that the air pressure within the insulated plenum chamber is at atmosphere.

By the use of this method of testing, an air duct may be used of such a size that air velocities through it of 1,500 to 3,000 f.p.m. are obtained.

Such velocities make velocity pressures sufficiently great for easy and accurate reading, yet do not interfere with the air delivery characteristics of the unit under test. This is because the burden of the resistance-to-flow through the high velocity duct will be carried by the wind tunnel fan.

In cases where a coil only is under test, the conditioning unit is replaced by the coil to be tested, and the wind tunnel fan is used to force air through the coil in the quantity permitted by the position of the air volume adjusting cone.

In addition to its use as a balancing chamber, the plenum chamber with its perforated baffle also serves to obtain an even distribution of air flow over the entire face of the coil or the unit under test.

The purpose of the discharge pressure box is to permit various resistance pressures to be imposed against the air-conditioning unit under test, so that its performance against various resistances due to ductwork may be determined.

The heater and the humidifier are regulated to maintain the desired wet and dry bulb temperatures, at the inlet of the coil or conditioning unit under test, by setting their respective globe type throttling valves to keep the steam flow slightly below that required. Final adjustment is secured by means of needle type regulating valves.

Wet and dry bulb temperatures, and velocity and static pressures are taken by the proper instruments located as shown by the diagram.

Fig. 94 shows a design for a wind tunnel which uses an orifice for measuring air.

With this type of wind tunnel the airflow is governed by the positions of the volume adjusting dampers. The use of a multi-speed or a variable speed motor also assists in regulating airflow.

This tunnel may be used for testing air-conditioning coils or complete units. When a coil is under test, the wind tunnel fan is used to draw the air through the coil, the airflow depending upon both the fan speed and the position of the volume adjusting dampers.

When a complete air-conditioning unit is under test, the usual procedure is to put it in normal operation, then, if a free delivery test is desired, to so regulate the wind tunnel fan speed and/or the volume adjusting dampers that the static pressure within the insulated receiving chamber is at zero.

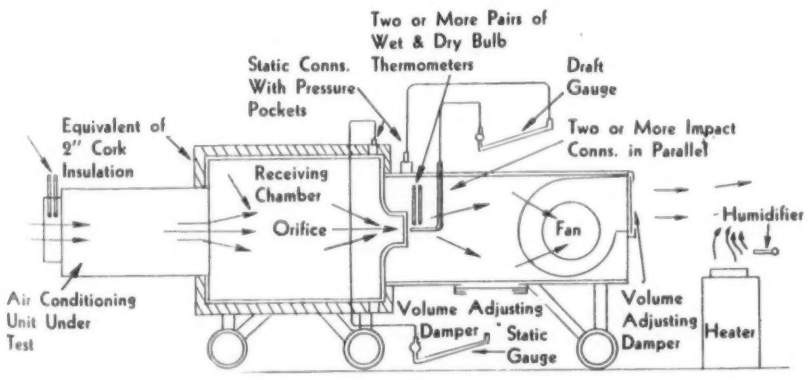
Various interior pressures are used, however, if the performance of the air-conditioning unit against various external pressures is to be determined.

Wet and dry bulb temperatures and air static pressures are indicated by the proper instruments as indicated by the sketch.

With this type of tunnel, the insulated receiving chamber should be of such dimensions that in the desired range of airflows, the air changes within the chamber will be from 20 to 90 per minute. The nozzle should be of such a size that the velocity of airflow through it will not be less than 3,000 f.p.m. at the throat.

Fig. 95 shows a standard orifice for use in the orifice type wind tunnel.

Fig. 94—Wind Tunnel Using Impact Orifice



By Steam Coils

3. By the steam coil method. By this method, the air which has come through the air-conditioning coil is sent through a steam heating coil, and the air temperature rise through the heating coil is measured.

The heat which is imparted to the air is found by multiplying the pounds of condensate by the difference between the total heat content of steam at the steam pressure in the coil and the heat content in the condensate leaving the coil.

The weight of air which passes through the coil is computed by taking the B.t.u. per hour delivered by the steam and dividing it by the specific heat of air times the temperature rise of the air during its passage through the heating coil.

The equation is:

$$APH = \frac{C(Hs - Hc)}{Sp\ HT \times TD}$$

APH=Air per hour in pounds.

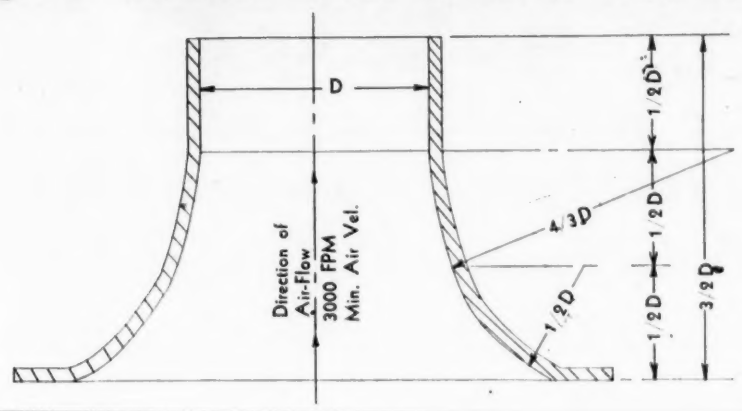
C=Condensate or steam per hour in pounds.

Hs=Total heat per pound of steam at steam pressure in coil.

Hc=Heat per pound of condensate at leaving temperature.

Sp HT=Specific heat of air (.24).

Fig. 95—Standard Orifice for Use in Wind Tunnel



TD=Temperature change in air when passing through coil.

Water flows may be measured by means of suitable flow meter, or by catching the water discharged in calibrated containers or in containers in which the water may be weighed.

Andrews & Moore to Handle Corozone in Cleveland

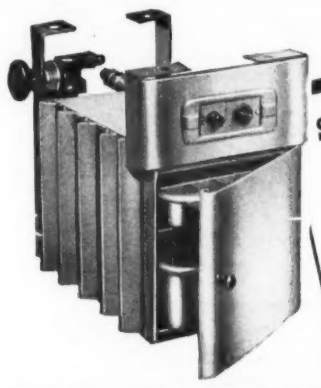
CLEVELAND — Matthew T. Andrews and Edward Y. Moore have been appointed Cleveland distributors for air-conditioning equipment manufactured by Corozone Air Conditioning Corp.

ABC Co. to Distribute Utica Line in Philadelphia

PHILADELPHIA — ABC Oil Burner & Engineering Co., Inc. has been appointed distributor in the metropolitan territory for the line of air conditioners manufactured by Utica Radiator Corp., according to C. W. Whitney, president of the distributorship.

ABC has assigned 10 specially trained men to work exclusively on this new line. The distributor's window displays include a complete year-around demonstration unit and a cut-away display model.

THE BUYER'S GUIDE



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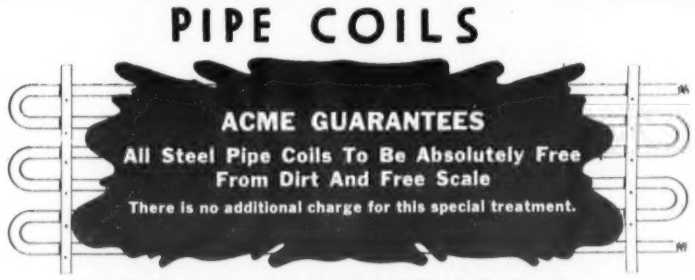

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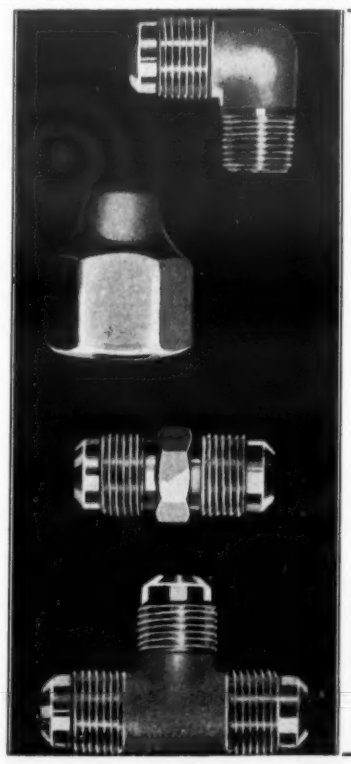

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ENGINEERING

Advantages of Combining Spray Conditioner with Cooling Coil Type Considered by Everetts

BY F. O. JORDAN

SWAMPSCOTT, Mass. — Possible advantages of combining the surface-convector type of heat transfer cooling unit with the saturation-type air washer were discussed in a paper here by John Everetts, Jr., at the opening of the first technical session of the semi-annual meeting for 1937 of the American Society of Heating & Ventilating Engineers.

Well known to air-conditioning engineers are the relative advantages and disadvantages of these two methods of conditioning air when used separately.

Chief advantage of the spray type air conditioner is its inherent ability to maintain exact control of dewpoint (hence absolute moisture content) of air regardless of initial condition, because through its action moisture either is added to or taken away from the air to maintain saturation at the required dewpoint.

Therefore, in spray type air conditioning, the desired dewpoint temperature is assured merely by providing spray banks of sufficient depth to insure saturation, and by maintaining the spray temperature at which saturation results in the dewpoint or absolute moisture content desired.

If the action of the sprays in maintaining a given dewpoint should result in an air dry-bulb temperature which is lower than desired, the dry-bulb temperature of the air is raised as required by "back heating" without disturbing the dewpoint which has been "pegged" at the level selected.

Because of its rigid regulation of the air's moisture content regardless of the air's condition upon entering, the air washer principle frequently is employed for air conditioning for certain processes, the success of which hinges upon extremely accurate control of humidity.

REGULATION LIMITED

As compared with the spray type conditioner in respect to its control of dewpoint under all conditions, the convector-surface type air conditioner's weakness is that it can regulate dewpoint only when the dewpoint of the air entering the conditioner is higher than the dewpoint temperature corresponding to the absolute moisture content required for the leaving air.

This is true because the surface type unit cannot raise dewpoint (or add moisture to the air). For this reason, when the dewpoint of the entering air is below the required dew point temperature of the air leaving the conditioner, the surface type cooling coil will fail in dewpoint control.

However, this characteristic of the surface convector is no drawback when it is employed in conditioning air for comfort cooling. Weather conditions do not exist, in the localities which require cooling for comfort, under which the dewpoint temperature is so low that discomfort can result from low moisture content.

According to Mr. Everetts, disadvantages of the spray type conditioner as compared with the convector-surface type of unit are as follows:

"The use of cooling coils in an air-conditioning system has long been recognized as having certain definite advantages over a system employing only an air washer. This is particularly true of comfort conditioning, where the exact simultaneous control of temperature and humidity is not as important as it is in an industrial installation.

"In spite of the many variables in the proper design of a cooling system, the coils have many advantages over a spray type dehumidifier.

"The heat exchange is counter-flow in a cooling coil, whereas in a washer it is cross-flow.

"That is, the water temperature leaving the cooling coil may be higher than air temperature leaving the coil as compared to an air washer where the leaving water must be lower than the leaving air. This directly affects the suction pressures of a refrigerating system, and also makes it possible to use well water in many cases."

CONVECTION ECONOMY

The heat transfer characteristics, says Mr. Everetts, are such that a temperature rise in the chilled water of 10 to 15° F. may be obtained in a coil, whereas in a washer the rise is only 5 to 6° F. Result is that a cooling coil system needs to circulate only one-half to one-third the quantity of water required by a washer.

"The water friction through the coils is considerably less than the pressure required on air washer nozzles, thus resulting in additional pump power saving.

"One of the most important characteristics, however, is the fact that the air does not come in direct contact with the chilled water.

"In certain industrial plants, where the water is cooled in a central refrigerating system and distributed to local conditioning units, it might be disastrous if the odors or flavors picked up by the air washer in one department were allowed to circulate in an air washer in an entirely different department. The coils or closed systems are the only alternative to this frequently disturbing problem."

The point brought out by the speaker regarding the higher refrigerating suction pressures permitted by the use of the surface convector is of importance because higher suction pressures result in greater refrigerating effects and higher efficiencies of the refrigerating unit. Thus operating costs are reduced, and the use of a smaller, and hence less expensive, refrigerating unit may be permitted.

COMBINATION BENEFITS

Mr. Everetts next described the benefits to be obtained by combining the spray method with the surface convector. Chief among these, he declared, was the more efficient operation of the combined equipment—this increased efficiency resulting from the advantages of the convector described above, and the ability of the spray to raise the dewpoint of the leaving air above the dewpoint of the entering air.

Even in comfort air conditioning, when lower dewpoints are not objectionable from the the point of comfort, the dry-bulb temperature reduction, due to the evaporative (or adiabatic) cooling action of the sprays under certain conditions of low entering dewpoint, is desirable because such cooling reduces the amount of the more costly cooling work to be done by the refrigerating equipment.

In this connection Mr. Everetts declared that, "the annual saving in operating costs of the refrigerating equipment is usually greater than the added cost of a saturation type washer."

DESIGNING SYSTEM

The speaker discussed the combination type of system as follows:

"In the design of an air washer system with precooling coils, it is usually preferable to design the coils to carry the full cooling load.

"As the cooling coil surface varies with the M.E.D., and the water quantity varies with the total heat, the coil should be designed with the lowest dry-bulb temperature which may frequently occur coincidentally with the design wet bulb. That is, if the general design conditions for air conditioning are 90° F. dry bulb and 75° F. wet bulb, then the coil should be designed for a condition of 75° F. saturated air, which occurs almost as frequently as the 90-75° condition.

"The 15° F. difference in the outside temperature may not necessarily reduce the total load in the conditioned spaces by more than a few per cent because in industrial air conditioning the product load, people, and motors are so great a proportion of the total load that the transmission load is not the predominant factor.

"This is not always the case, however, and it is, therefore, good practice to check these values before considering the coil design conditions."

The following design conditions of a system have been selected to illustrate some of the pertinent points which must be considered in designing a combination coil and washer system.

Outside air—90° F. dry bulb and 75° F. wet bulb.

Return air—70° F. dry bulb and 50% relative humidity.

Delivered air—46° F. saturated.

Case I—15% outside air and 85% return air.

Case II—50% outside air and 50% return air.

Case III—100% outside air and 0% return air.

Case IV—100% outside air and 0% return air;—outside wet bulb—46° F.

"In case I where only 15% outside air is used, there is no increase in coil surface with lowering of the outside dry-bulb temperature and with fixed design wet bulb. The reason for this is that the net change of dry bulb of the entering mixture is very small, although it is sufficient to reduce the sensible heat load to compensate for the lower K factor, thus giving approximately the same surface area.

"In case II the drop in outside dry-bulb temperature is more apparent in the mixture and requires approximately 3% more surface at the 75° F. saturated condition of outside air and at the condition of 90° F. dry and 70° F. wet bulb.

"In case III where all outside air is used, the increase in surface caused by the decrease in dry-bulb temperature is approximately 12% or enough to seriously affect the proper operation of a system when a 75° F. saturated condition occurs.

"Case IV illustrates the point that if the wet bulb entering the coil is at or below the required delivered dew point and the entering dry bulb is above this point, there can be no control of the delivered dewpoint. As it is necessary to reduce the dry bulb, it is necessary to use refrigeration effect as indicated.

"If an air washer is used in conjunction with the coils, the air at conditions shown in case IV could be adiabatically saturated at the entering wet bulb, thus eliminating the necessity of refrigerating effect and definitely controlling the delivered dewpoint at the same time.

"The power required to operate the saturation type washer in conjunction with the coils is only 2 to 5% greater than the total power requirements of the normal system, taking into consideration the saving in power of the chilled water pump due to the smaller water quantity and smaller total head.

"The fan power is increased by the resistance of coils on the washer, and may or may not make a considerable difference in the total power, depending upon the type and design of the air handling system.

CONTROLS NEEDED

"The automatic controls necessary for the proper summer and winter operation of a combination of precooling coils and air washer are greatly simplified.

"The thermostat, located either in the washer tank, washer outlet, or pump suction, controls the quantity of chilled water to the cooling coils through the throttling valve, or the quantity of steam to either the water heater or an air preheater to control the wet bulb of the air entering the washer.

"It must be kept in mind, however, that the washer must be of the saturation type in order that this control may adequately fix the dewpoint of the air leaving the washer.

"The winter operation of such a system is the same as a conventional air washer system.

"The reheat requirements in the summer are also the same as in a conventional air washer system in which either low pressure steam or a by-pass may be used. If a by-pass is used, it is preferable to use a washer of full fan capacity to take advantage of evaporative cooling and savings in refrigerating operating costs when the outside wet-bulb is suitable.

"With the refined development of cooling coils and the established dependability of the air washer, the combination of the two properly designed brings the problem of industrial air conditioning and comfort cooling nearer to perfection."

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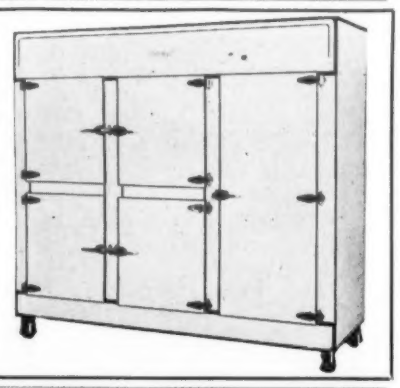

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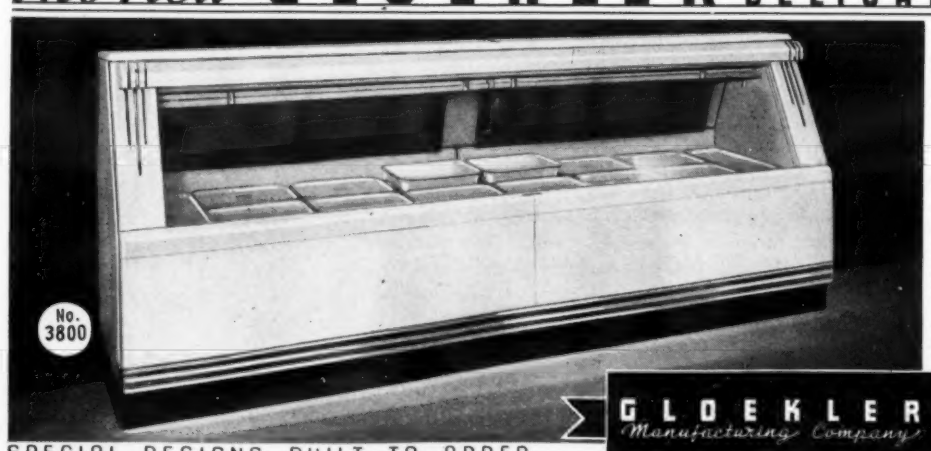

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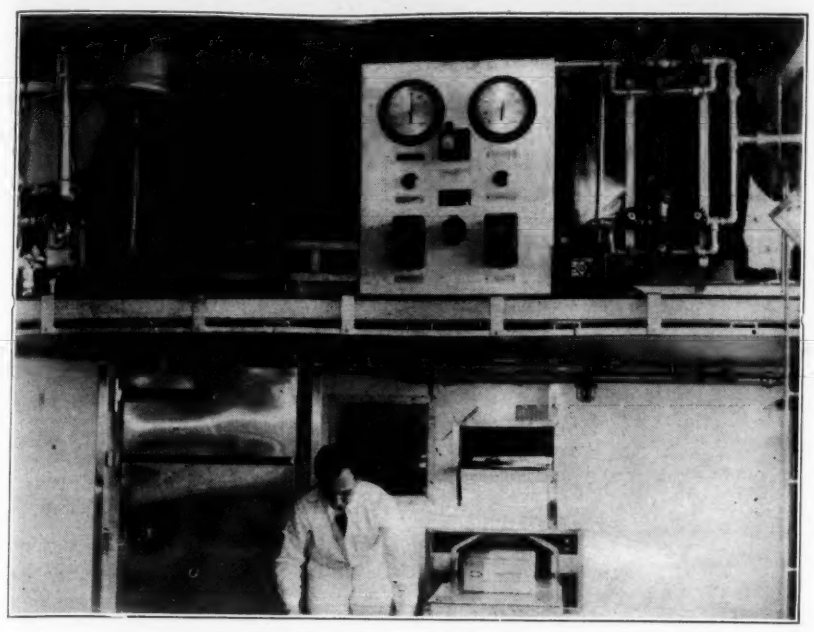

View of equipment which provides comfort cooling in slicing, wrapping, and sealing room of a newly remodeled baking plant. Wrapped bread passes on a conveyor through an opening in the wall into the shipping room, from which this photograph was taken. The bread conveyor opening is seen at lower right of bakery worker. The air-conditioning equipment is mounted directly above the wrapping room, which is entered through steel door at left.

* * *

Process and Comfort Air Conditioning Installation in Remodeled Bakery Puts It Among Country's Most Modern

BRIDGEPORT, Conn.—Newly remodeled plant of Borck & Stevens Baking Co., Inc. here incorporates an air-conditioning system claimed to be one of the most complete and modern installed in any bakery in this vicinity. Full summer and winter conditioning is provided in the bread cooling and slicing and wrapping departments, while the fermentation room and proof box are humidified and there is extensive use of refrigeration in other departments.

The bread cooler, which is of the counterflow type, is equipped with an evaporative-type conditioning unit of all-copper construction, capable of cooling the bread to a temperature of 90° F. on inside of loaf in an hour and 30 minutes.

The wrapping and slicing room adjacent to the cooler is air conditioned for comfort cooling, and the unit which does this work is of all-copper construction fitted with a 4-ton ammonia coil.

This room is held at a temperature of 70° F. with 60% relative humidity. Air volume is sufficient to maintain the room under a slight pressure at all times.

The fermentation room is maintained at a temperature of 78° F., with a permissible variation of 2° F. plus or minus, and a relative humidity of 80%. Ductwork is so designed, and static pressure so calculated as to provide a uniform air circulation throughout the entire room.

Temperature and relative humidity are maintained through an ice-water coil installed in the sump tank, automatically controlled and actuated by an ice-water valve which permits introduction of chilled water when conditions require it.

Condition inside the proof box is held at 95° F., with permissible variation of 2° F. plus or minus, and a relative humidity of 85%.

All equipment in the Borck & Stevens air-conditioning installation, which was made by the Latendorf Conveying Corp., elevating and conveying machinery and industrial air conditioning, Bayonne, N. J., is of copper construction throughout, with all supporting interior structural members of brass, according to Charles B. Latendorf, president. The entire equipment is fully automatic.

Refrigeration equipment used for the conditioning system and for other purposes was installed by The Connecticut Ice Machine Co., Inc. South Norwalk, Conn., and John L. Irving of that company terms the whole job as "undoubtedly the most modern installation of its type in New England."

A 20-hp. Baker ammonia compressor cools water over a Baudelot-type water cooler. The installation is fully automatic with a flooded recirculating ammonia control which provides the fullest efficiency from the cooling equipment.

A thermostat controls the machine operation and maintains the cold water at 33° F. at all times. The cold water is pumped to the equipment requiring it which includes the dough mixer jackets, mix tank, air-conditioning units, etc.

In addition to the main refrigerating machine there is a second Baker 5-hp. Freon refrigerating unit cooling to 40° F. a basement cooler measuring approximately 40 x 40 feet with two forced-draft unit coolers. This cooler is used for the storage of ingredients.

A York 5-hp. ammonia machine is used to cool to 34° F. a box approximately 14 feet square which is used for the storage of cake ingredients on the second floor. This unit also provides refrigeration for the bread cooling room.

The two ammonia machines are housed in a penthouse on the roof of the baking plant, so that interruption of production through the possible breakage of a line is guarded against. The Freon unit is in the basement, adjacent to the 40 x 40-foot cooler.

Novel feature of the plant construction is extensive use of glass brick in the walls of the newly completed cake shop and elsewhere in new sections of the building.

The translucent material floods the interior with daylight, and, according to Harold G. Stevens, secretary-treasurer of the baking company, will be 30% cooler in summer and 30% warmer in winter than walls of clay brick or other construction.

Residence Installation Using Present Hot Air Ducts Made by Natkin

TULSA, Okla.—A complete air-conditioning unit built up on the intake side of an existing gas-fired hot air furnace has been installed by Natkin & Co., Westinghouse dealer, in the home of Nathan Appleman, president of Central Petroleum Co. The installation furnishes an example of how an ordinary hot air heating system may be quite readily converted into a year-around air-conditioning system.

This unit is located between the furnace and the return air grille in the floor of the first floor, and consists of a squirrel cage blower, cooling coil, humidifier sprays, and filters. It is equipped with a Westinghouse 5-hp. sealless compressor.

An outside intake provides a constant supply of outside air. Operation of the unit is controlled by a thermostat located near the return grille.

Supply grilles of the old hot air system, which were located in the baseboards of the various rooms, were equipped with new deflectors which throw the cooled air upwards along the walls of the room.

New ductwork was carried to the roof, and from there outlets were provided into the enclosed sleeping porch, shower room, and one of the second story bathrooms which before did not have adequate heating or ventilation.

Brooklyn Dept. Store Completes 200-Ton Air Control System

BROOKLYN — Installation of a 200-ton Carbondale refrigerating unit as the central part of a $50,000 air-conditioning system in McCrory's department store here has been completed by Walter E. Rapp, air-conditioning engineer.

The system circulates 3,000,000 cu. ft. of air per hour throughout the first floor and basement sales rooms.

Carbondale New York Co., Inc. supplied the air-conditioning and refrigerating equipment; Charles Hartman Co., sheet metal; Ideal Electric Contracting Co., electrical connections; J. A. O'Rourke, plastering; C. J. Schulter, Inc., cooling towers and plate construction; William J. Scully, metal furring; and Witlock Coil Pipe Co., pipe and cooling coil work.

H. D. Best McCaffrey was general contractor.

Zahniser & Warren to Handle General Electric Line

SPOKANE, Wash.—Zahniser & Warren has dropped its general line of heating equipment to specialize in the sale of General Electric air-conditioning units throughout Spokane county, according to A. E. Warren of the dealership.

The company has increased its sales and installation staffs by 50%, Mr. Warren reported.

775-Ton Air Conditioning System to Cool Memphis Department Store

MEMPHIS, Tenn.—The 775-ton air-conditioning installation being made in J. Goldsmith & Sons Co. department store by York Ice Machinery Corp. according to specifications drawn up by Leo S. Weil and Walter B. Moses, consulting engineers, will be one of the South's largest all-year systems when completed, it is claimed.

Precooling equivalent to daily melting of 175 tons of ice will be effected by 576,000 gallons of 62° F. water pumped through the cooling coils from an artesian well. This water also will serve to condense the refrigerant in the refrigerating system.

In addition to this precooling, two York Freon refrigeration systems will be installed to cool 1,036,800 gallons of water to a temperature of 45° F. during each eight-hour day. This water then will be circulated through air washers and cooling coils located in various air streams. This refrigerating plant will have a capacity equivalent to the melting of 600 tons of ice per day.

The installation will include 17 large blower-type fans with a total air-circulation capacity of 15,477,000 c.f.m.

Temperature and humidity in both summer and winter will be automatically controlled. Each floor will be divided into zones, and each zone will be independently controlled so that conditions in one zone will not fluctuate when abnormal conditions in other zones are being satisfied.

A means of checking temperatures in various parts of the building will be provided by installation in the chief engineer's office of a master electrical thermometer, wired to 14 individual thermometer stations throughout the building. To read the temperature of any of the 14 stations, it will be necessary only to "plug in" at the central station, just as on a telephone switchboard.

Hulse Joins Carrier's Spokane Dealership

SPOKANE, Wash.—C. W. Hulse, Carrier-trained engineer from Omaha, has joined Brown-Johnston Co., Carrier dealer, as manager of the air-conditioning department.

R. M. Stern, from Carrier's home office in Newark, has also joined the Brown-Johnston organization.

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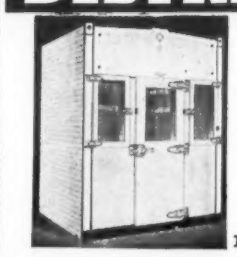

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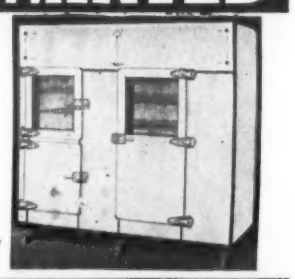

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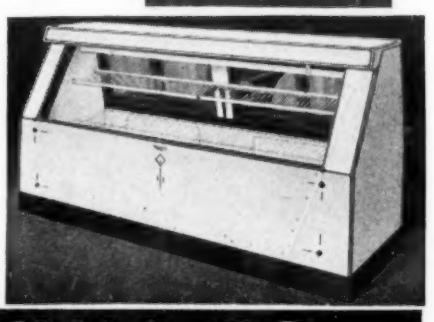

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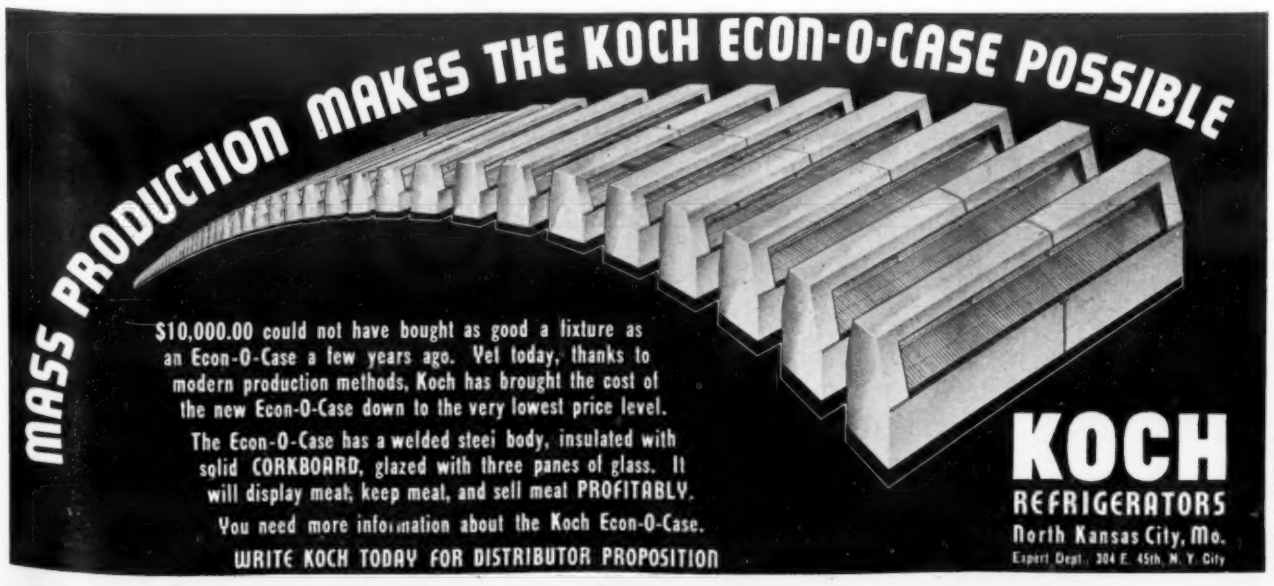
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SERVICE METHODS

Fittings for Adapting Actual O.D. Size Copper Tubing To Nominal Size Tubing

There are three outside diameter sizes of copper tubing. Purpose of this article is to make possible the adaption of one outside diameter size to another.

The three outside diameter sizes of copper tubing are: Actual O. D.; Nominal; and Outside diameter iron pipe size.

Actual O. D. size as the name implies, goes by the **outside diameter (O.D.) measurement.** A 1-inch actual O. D. size copper tubing has an outside diameter of one inch. One-and-one-quarter-inch actual O.D. size has an outside diameter of 1¼ inch, etc.

Nominal size copper tubing goes by the **inside diameter measurement.** A one-inch nominal size copper tubing has an inside diameter of approximately one inch, and an outside diameter of 1⅛ inch. One-and-one-quarter-inch nominal size copper tubing has an inside diameter of approximately 1¼ inch, and an outside diameter of 1⅜ inch. One-and-one-half-inch nominal size copper tubing has an inside diameter of 1½ inch, while the outside diameter is 1⅝ inch, etc.

Outside diameter iron pipe size copper tubing is more commonly called copper pipe. It has the same outside diameter as standard weight iron pipe. O.D. iron pipe size is not ordinarily used for refrigeration and air-conditioning installation work and further reference to this type of tubing will be omitted to avoid confusion.

Nominal size copper tubing is the commonest size used in refrigeration and air-conditioning installations. Most equipment manufacturers supply nominal size outlets on their compressor valves, evaporator connections, and control equipment.

Nominal size is also more generally carried in stock by refrigeration supply jobbers. Reason for this is that nominal size is the standard of the plumbing industry and is available from all manufacturers of hard-drawn copper tubing. It has become the standard size for refrigeration and air-conditioning work.

Sweat-tube, solder-type fittings for nominal size copper tubing are also more readily available and are considered the standard of the industry.

Actual O.D. size copper tubing is made by some of the tubing mills in limited quantities due to a demand created especially by one large manufacturer of refrigeration and air-conditioning equipment that provides outlet connections on evaporators and compressor valves in actual O.D. sizes.

Actual O.D. size copper tubing solder type fittings are manufactured in all sizes up to and including 2 inches (actual inside diameter) by Mueller Brass Co.

When the compressor, evaporator, and control equipment are equipped with actual O.D. connections, and actual O.D. size copper tubing and sweat fittings are all supplied to the installation man, he has no difficulty in completing the installation, as everything will fit.

Difficulty is experienced when compressor and evaporator equipment are supplied with **Actual O.D.** connections and the copper tubing and fittings are **nominal size.**

Main reason for this difficulty is, according to the information available, that there are no adaptors made for the express purpose of adapting one size to the other. This condition has caused considerable loss of time and much confusion among service and installation engineers.

It has been discovered, however, that the Arco type 208 copper-to-copper female reduction coupling or its equivalent would serve this purpose, although not originally intended to do so. Its use is flexible in that it not only changes from actual O.D. to nominal, but it also allows for a reduction or increase in the nominal size.

The drawing in Fig. 1 shows type 208 female reduction coupling, used as an adaptor from actual O.D. copper tubing to nominal copper tubing. For this purpose the outside of the fitting is inserted into an O.D. size coupling.

PROBLEM 1

To demonstrate further the use of the adaptor from O.D. to nominal, assume the problem to be an evaporator with a one-inch actual O.D. suction line connection, and 1⅛ inches nominal tubing is to be used for the suction line.

EXAMPLE 1

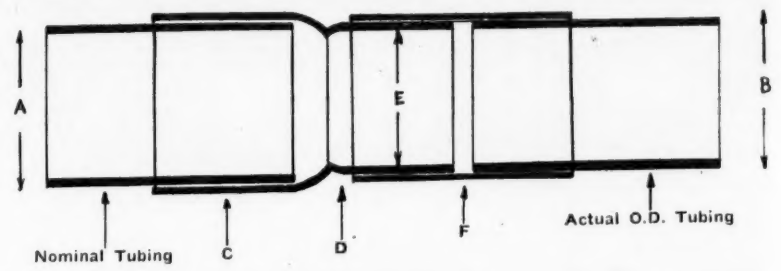
Install a one-inch O.D. Mueller Streamline coupling (Cat. No. A-2382) or equivalent, (C, Fig. 1) on the one-inch O.D. evaporator outlet.

Insert the ⅞ inch I.D. (approximately O.D. one inch) end (see E, Fig. 1) of an Arco type 208, (or equivalent) size 1⅛ inch x ⅞ inch, female reduction coupling, into the one-inch O.D. coupling. This provides a female connection to fit one-inch nominal (1⅛ inch O.D.) copper tubing for the suction line.

Many other combinations of size

(Concluded on Page 21, Column 1)

Fig. 1—Adapting from Actual O.D. to Nominal



From 1 in. Actual O.D. to Nominal

A Actual O.D. In.	B Actual O.D. In.	C Actual I.D. In.		D Actual I.D. In.	E Approximate O.D. In.	F Actual I.D. In.
1	½†	1		⅞	1	½
1	⅝†	1	Mueller	⅞	1	⅝
1	¾†	1	Streamline	⅞	1	¾
1	⅞*	1	Coupling	⅞	1	⅞
1	1⅛†	1	Cat. No.	⅞	1	1⅛
1	1⅜†	1	A-2382	⅞	1	1⅜
1	1⅝†	1		⅞	1	1⅝
1	2⅛†	1		⅞	1	2⅛

From 1¼ in. Actual O.D. to Nominal

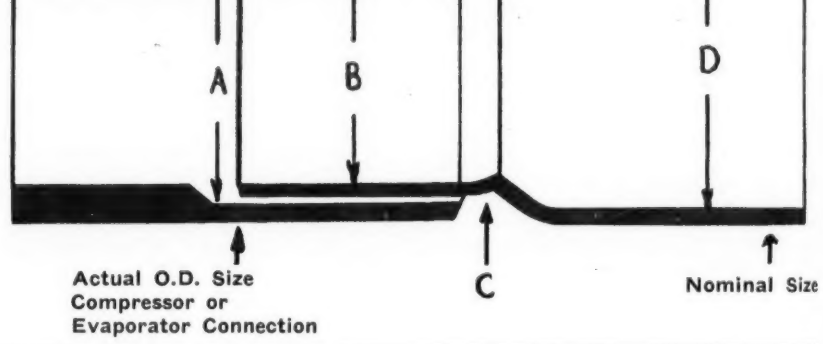
A Actual O.D. In.	B Actual O.D. In.	C Actual I.D. In.		D Actual I.D. In.	E Approximate O.D. In.	F Actual I.D. In.
1¼	½†	1¼		1⅛	1¼	½
1¼	⅝†	1¼	Mueller	1⅛	1¼	⅝
1¼	⅞†	1¼	Streamline	1⅛	1¼	⅞
1¼	1⅛*	1¼	Coupling	1⅛	1¼	1⅛
1¼	1⅜†	1¼	Cat. No.	1⅛	1¼	1⅜
1¼	1⅝†	1¼	A-2463	1⅛	1¼	1⅝
1¼	2⅛†	1¼		1⅛	1¼	2⅛

From 1½ in. Actual O.D. to Nominal

A Actual O.D. In.	B Actual O.D. In.	C Actual I.D. In.		D Actual I.D. In.	E Approximate O.D. In.	F Actual I.D. In.
1½	⅝†	1½	Mueller	1⅜	1½	⅝
1½	⅞†	1½	Streamline	1⅜	1½	⅞
1½	1⅛†	1½	Coupling	1⅜	1½	1⅛
1½	1⅜*	1½	Cat. No.	1⅜	1½	1⅜
1½	1⅝†	1½	A-2477	1⅜	1½	1⅝
1½	2⅛†	1½		1⅜	1½	2⅛

*Use Arco No. 207 copper to copper coupling or equal.
†Use Arco No. 208 female reduction coupling or equal.

Fig. 2—Adapting Female Actual O.D. to Female Nominal



From 1 in. Actual I.D. to Female Nominal

A Actual I.D. In.	B Actual I.D. In.	C Approximate O.D. In.	D Actual I.D. In.
1	⅞	1	½†
1	⅞	1	⅝†
1	⅞	1	¾†
1	⅞	1	⅞*
1	⅞	1	1⅛†
1	⅞	1	1⅜†
1	⅞	1	1⅝†
1	⅞	1	2⅛†

From 1¼ in. Actual I.D. to Female Nominal

A Actual I.D. In.	B Actual I.D. In.	C Approximate O.D. In.	D Actual I.D. In.
1¼	1⅛	1¼	½†
1¼	1⅛	1¼	⅝†
1¼	1⅛	1¼	⅞†
1¼	1⅛	1¼	1⅛*
1¼	1⅛	1¼	1⅜†
1¼	1⅛	1¼	1⅝†
1¼	1⅛	1¼	2⅛†

From 1½ in. Actual I.D. to Female Nominal

A Actual I.D. In.	B Actual I.D. In.	C Approximate O.D. In.	D Actual I.D. In.
1½	1⅜	1½	⅝†
1½	1⅜	1½	⅞†
1½	1⅜	1½	1⅛†
1½	1⅜	1½	1⅜*
1½	1⅜	1½	1⅝†
1½	1⅜	1½	2⅛†

*Use Arco No. 207 copper to copper coupling or equal.
†Use Arco No. 208 female reduction coupling or equal.

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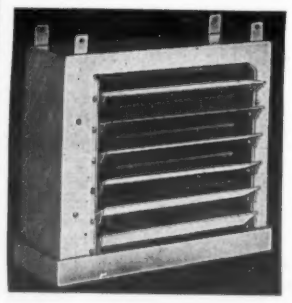

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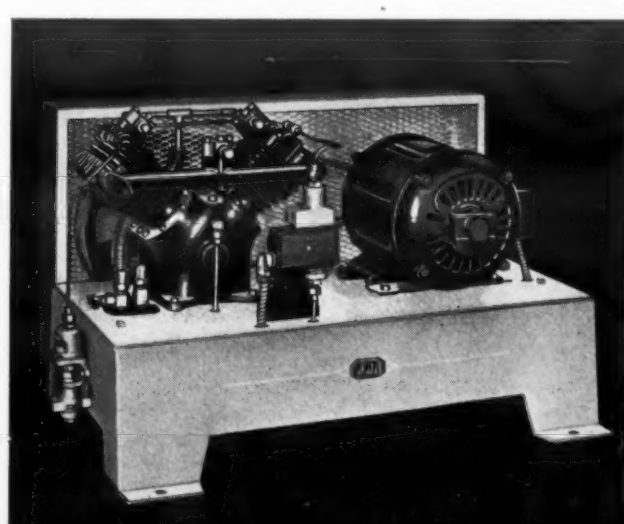

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Multiple cylinders of large capacity insure very low operating speeds. Sizes 1/3 to 1 horse power are two cylinder pumps. Sizes 1½ to 10 horsepower are V type four cylinder pumps.
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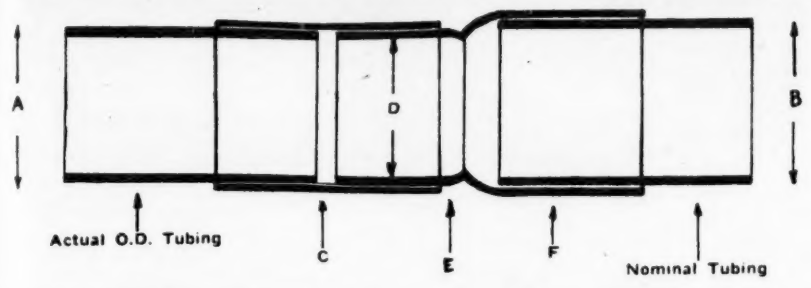
Fig. 3—From Male Nominal to Male Actual O.D.



From Nominal to 1 in. Actual O.D.

A Actual O.D. In.	B Actual O.D. In.	C Actual I.D. In.	D Approx. O.D. In.	E Actual I.D. In.	F Actual I.D. In.	
½†	1	½	1	⅞	1	
⅝†	1	⅝	1	⅞	1	Mueller Streamline Coupling Cat. No. A-2382
¾†	1	¾	1	⅞	1	
⅞*	1	⅞	1	⅞	1	
1⅛†	1	1⅛	1	⅞	1	
1⅜†	1	1⅜	1	⅞	1	
1⅝†	1	1⅝	1	⅞	1	
2⅛†	1	2⅛	1	⅞	1	

From Nominal to 1¼ in. Actual O.D.

A Actual O.D. In.	B Actual O.D. In.	C Actual I.D. In.	D Approx. O.D. In.	E Actual I.D. In.	F Actual I.D. In.	
½†	1¼	½	1¼	1⅛	1¼	
⅝†	1¼	⅝	1¼	1⅛	1¼	Mueller Streamline Coupling Cat. No. A-2463
¾†	1¼	¾	1¼	1⅛	1¼	
⅞†	1¼	⅞	1¼	1⅛	1¼	
1⅛*	1¼	1⅛	1¼	1⅛	1¼	
1⅜†	1¼	1⅜	1¼	1⅛	1¼	
1⅝†	1¼	1⅝	1¼	1⅛	1¼	
2⅛†	1¼	2⅛	1¼	1⅛	1¼	

From Nominal to 1½ in. Actual O.D.

A Actual O.D. In.	B Actual O.D. In.	C Actual I.D. In.	D Approx. O.D. In.	E Actual I.D. In.	F Actual I.D. In.	
⅝†	1½	⅝	1½	1⅜	1½	Mueller Streamline Coupling Cat. No. A-2477
⅞†	1½	⅞	1½	1⅜	1⅜	
1⅛†	1½	1⅛	1½	1⅜	1½	
1⅜*	1½	1⅜	1½	1⅜	1½	
1⅝†	1½	1⅝	1½	1⅜	1½	
2⅛†	1½	2⅛	1½	1⅜	1½	

*Use Arco No. 207 copper to copper coupling or equal.
†Use Arco No. 208 female reduction coupling or equal.

Problems in Adapting Copper Tubing

(*Concluded from Page 20, Column 3*)

are given in the table accompanying Fig. 1.

PROBLEM 2

Problem 2 anticipates a condition where a compressor is equipped with a one-inch actual O.D. size female suction line connection, and the tubing for the suction line is to be one-inch nominal (1⅛ inch O.D.)

EXAMPLE 2

To adapt from one inch actual O.D. size to 1 inch nominal size, (see Fig. 2) install the ⅞-inch end of an Arco type 208 (or equivalent) size 1⅛-inch x ⅞-inch female reduction coupling in the compressor valve connection. This will, as shown in Fig. 2, result in dimension "D" being 1⅛-inch I.D. to fit one-inch nominal tubing.

Adaptions from 1¼ inch and 1½ inch actual O. D. size to nominal are given on chart below Fig. 2.

PROBLEM 3

This condition is the reverse of Problem 1, and may be clearly noted in Fig. 3.

The chart for Fig. 3 shows many other combinations that may be made with the various size adaptors.

While the type 208 is not actually made for this purpose, it will serve a very useful purpose. Its use in this instance, however, may require that the slight burr, caused by stamping the trade name on the outside of the fitting, be filed down.

It is also possible that the fit might not be as exact as if the finished (inside) surface of the fitting were utilized.

Odorozzi Made Ward Service Manager

CHICAGO — Charles Odorozzi, product manager for Rex Cole, Inc., New York General Electric distributor, is resigning his position with that organization as of July 1 to become national service manager of Montgomery Ward & Co., with headquarters here.

Mr. Odorozzi began his career in the refrigeration industry in 1928, when he joined R. Cooper Jr., G-E distributor in northern Illinois and Indiana, after leaving Northwestern university.

For seven years he assisted in the organization and direction of the Cooper service department, working under L. C. Kohlman, and won national recognition in 1934 as one of G-E's best installation and service managers.

In 1935 he resigned his position in the Cooper organization, and was appointed manager of the Rex Cole product service department in New York City. In less than three years he organized for Rex Cole what is reputed to be one of the country's outstanding service departments, handling service on almost half a million G-E refrigerators and other major appliances over a 15,000-mile area in New York and Connecticut.

He also coordinated all of the mechanical functions of the Cole organization, including warehousing, delivery and installation, engineering, permanent properties, and property maintenance.

Temprite Releases New Price List on Repairs And Replacements

DETROIT—A new repair-and-replacement price list has recently been issued to its dealers by Temprite Products Corp. Printed on only one side, the list is suitable for mounting on cardboard and hanging on service department walls.

Covering every type of Temprite unit ever yet manufactured, the price list is designed to assist dealers to:

1. Adapt old coolers to new refrigerants.
2. Identify those current float and control valves which should replace obsolete ones.
3. Calculate flat rate charges on all service and replacement work.
4. Return equipment to the factory for needed repairs.

New Marsh Folder Describes Refrigeration Instruments

CHICAGO—Picturing and describing in detail various Marsh refrigeration instruments, a new folder for distribution to manufacturers, distributors, and dealers has been issued by the Jas. P. Marsh Corp. of this city.

Included in the piece of literature are articles concerning the Marsh recalibrator gauge, standard pressure gauges, ammonia gauge, and "Serviceman," refrigeration service thermometer.

Paragon Announces Two Switch Improvements

CHICAGO—Two improvements in the design of its synchronous time switches have been announced by Paragon Electric Co. here.

First improvement is in the new case design. Cases are seamless, drawn from 16-gauge steel, and made with an interlocking joint between the shallow cover and deeper base. A continuous cork gasket closes the joint to dust and moisture.

The "clear-line" dial and trip assembly, the second improvement, allows for easy, accurate, and non-slip setting of the time dial and switch tripper.

Nickerson to Sell Allen-Bradley Controls in Mountain Region

SALT LAKE CITY—Nickerson Machinery Co. has been appointed distributor in Utah, southern Idaho, and western Wyoming, for Allen-Bradley Co., Milwaukee manufacturer of motor controls.

Rockwood Pamphlet Describes 'Dualsteel' Unions

WORCESTER, Mass. — Rockwood Sprinkler Co., maker of "Dualsteel" unions for use in the refrigeration and other industries, has just issued a pamphlet describing the union and its qualities, applications, and method of manufacture.

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PATENTS

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THE BUYER'S GUIDE

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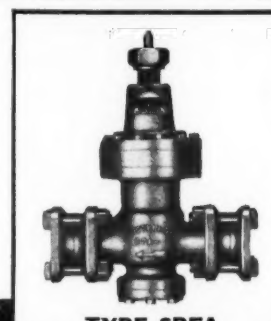

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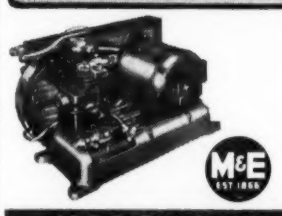

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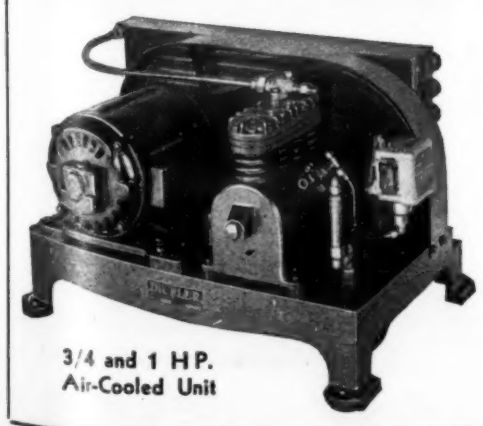

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How Refrigerants Compare When Measured in Terms Of a Theoretical Ideal

FRENCH LICK, Ind.—How methyl chloride compares with the standard of the "ideal" refrigerant and also how it compares with other refrigerants was discussed in a paper presented at the final technical session of the recent A.S.R.E. convention here by E. W. McGovern, chief engineer of the R. & H. Chemicals Department of E. I. du Pont de Nemours & Co., Inc.

In dealing with his subject Mr. McGovern first listed the qualities of the ideal refrigerant, and then measured up methyl chloride and other refrigerants in terms of these various classifications. Excerpts from his discussion under the various subheadings follow:

STABILITY

A refrigerant should not decompose at any temperature that may be encountered in the refrigeration system. Further it should not polymerize forming higher boiling or solid substances.

All of the refrigerants in common use today show satisfactory stability in the absence of substances foreign to a refrigeration system, since stability is an absolutely necessary requirement of a refrigerant. Methyl chloride is thermally stable up to about 800° F., a dull red heat, and it does not polymerize.

CORROSIVENESS AND SOLVENT

A refrigerant should be chemically inert and exhibit no solvent power toward any material of construction with which it may come in contact. This includes metals, gaskets, and, in the usual hermetic units, varnishes, motor windings and insulating materials.

Action on metals. In the absence of moisture, methyl chloride is noncorrosive to all common engineering metals. However, zinc, aluminum, die casting and possibly magnesium alloys should not be used in contact with it as these are strongly attacked in the presence of small amounts of moisture.

All refrigerants in use are noncorrosive to common engineering metals in the absence of moisture. All with the probable exception of unsubstituted hydrocarbons such as ethane, propane and isobutane, when in the presence of moisture sooner or later show greater corrosive effects than would be obtained from water alone.

Sulphur dioxide with water immediately forms sulphurous acid which is very corrosive to most metals. Ammonia and water in the presence of oxygen from air so strongly and readily attack copper as to make it inadvisable to use copper with this refrigerant. Methyl formate is hydrolyzed by water to methyl alcohol and formic acid, the latter being corrosive.

The halogenated hydrocarbons used as refrigerants, those containing chlorine and/or fluorine in their molecules and including methyl chloride, methylene chloride, and the various Freons, in general exhibit superior stability and, therefore, low corrosiveness in the presence of moisture.

Over long periods of time, and especially at higher operating temperatures, compounds of this class tend to react with water, forming corrosive hydrochloric and/or hydrofluoric acids in small amounts.

For this and other reasons the moisture content of these refrigerants should be low, although they possess a very important advantage, especially over sulphur dioxide, in that moisture may be present but will do little or no harm if removed in a reasonable period of time and further, in that mosture may be easily removed by installation of chemical dryers on the refrigeration equipment.

PROPERTIES

Gaskets. Methyl chloride is a solvent for many organic materials and composition gaskets must be selected carefully. In general they should not contain rubber and many Neoprene compositions cannot be used. Pressed fibers including asbestos, with a number of insoluble binders may be used, as may also metallic gaskets.

All refrigerants in use may be gasketed satisfactorily although special problems may be presented.

Motor windings, insulator materials, varnishes, etc. Hermetically sealed units embodying an electric motor running in the presence of refrigerant and oil present special problems. Obviously such systems must be dry, if only to prevent short circuits, and the refrigerant itself must not conduct electricity.

Methyl chloride is successfully used in hermetic units. Cotton on motor windings must be properly cleaned and degummed and insulators and varnishes must be selected with proper regard to the solvent powers of methyl chloride.

Various synthetic resins including Bakelite are satisfactory. Flaking of varnish is not due to the refrigerant, but is generally caused by improper preparation of the surface prior to application. Problems with hermetic units are in general the same with all refrigerants although they may differ in details.

VOLUME (PISTON) DISPLACEMENT

For reasons of compactness, reduction of friction area and friction loss, reduction of piston stroke, reduction of area for slippage of gas past compressing element from high to low side and reduction of compressor speed, the volume of gas which must be compressed per unit of time for a given refrigeration effect should in general be as low as possible.

An Up-to-Date and Critical Study of Refrigerants

Editor's Note: Many refrigerating engineers attending the recent midyear convention of the American Society of Refrigerating Engineers at French Lick, Ind. expressed the thought that the paper delivered by E. W. McGovern of the R. & H. Chemicals Dept. of E. I. du Pont de Nemours & Co. on "Methyl Chloride—A Practical Refrigerant Measured by the Theoretical Ideal," to be the most significant study of refrigerants to be made in recent years.

Mr. McGovern's paper not only covered the properties and characteristics of methyl chloride, but also measured up other refrigerants to the yardstick of the ideal refrigerant.

Extracts from Mr. McGovern's article will be published in two instalments—in this, and in a subsequent issue of the NEWS.

An exception to this is in the case of refrigerants for lower tonnage centrifugal compressors where, at least with existing designs, volume of gas handled should be comparatively large. Low volume displacement is unimportant in the case of some low capacity, high speed rotary compressors.

Methyl chloride has a relatively low volume displacement, which adapts it for use in reciprocating compressors ranging from the smallest sizes to machines of up to 20 tons capacity. This includes compressors for household and commercial refrigeration.

Generally, low volume displacement (high pressure) refrigerants (up to and including isobutane) are used in reciprocating compressors; high volume displacement (low pressure) refrigerants from Freon-11 to water are used in large tonnage centrifugal compressors; intermediate volume (intermediate pressure) refrigerants from sulphur dioxide to methylene chloride are used in rotary compressors.

There is no hard and fast drawn rule governing this and we have examples of ammonia used in large tonnage centrifugals, Freon-12 used in a centrifugal in a very low temperature stage of a three-stage system and methyl chloride used in larger rotaries. However, we do not find lower pressure refrigerants used in reciprocating compressors.

CONDENSING PRESSURE

Condensing (high side) pressure should be low so as to allow of light weight equipment which in turn affects initial cost, power consumption (heavy moving parts), compactness, and installation problems.

High pressure increases the tendency toward leakage on low side as well as high side, when pressure is built up during shut down periods, and in addition to reasons of economy, is very important from the standpoint of toxicity and fire hazard. In general, a low volume displacement accompanies a high condensing pressure and a compromise must, therefore, usually be drawn between the two in selecting a refrigerant.

Methyl chloride presents a nice balance between volume displacement and condensing pressure, the latter being 81 lb./in.²g. at 86° F. Extra heavy construction is not required so that there is little or nothing to be gained from the standpoint of weight of equipment in using a lower pressure refrigerant.

EVAPORATING PRESSURE (BOILING POINT)

Evaporation (low side) pressures above atmospheric pressure are desirable to avoid leakage of moisture laden air into the refrigeration system and to permit easier detection of leaks. This is especially important with unsealed units.

Air increases head pressures resulting in inefficient operation or complete cessation of refrigeration. Moisture causes corrosion, may result in harm to lubricant, and may freeze out and stop operation of the equipment.

In general, the higher the evaporation pressure, the higher the condensing pressure under a given set of temperatures and, therefore, in order to keep head pressures at a minimum and still have positive low side pressures, the refrigerant selected should have a boiling point at atmospheric pressure as close as possible to the lowest temperature to be produced under ordinary operation conditions.

Methyl chloride with a boiling point of —10.65° F. is close to ideal in this respect for the bulk of refrigeration applications. A still lower boiling point is of some advantage only if and when lower operating temperatures are wanted

FREEZING POINT

Freezing point of a refrigerant should be below any temperature that might be encountered in machine operation. Freezing points of all refrigerants except water (32° F.) and carbon dioxide (—69.9° F. triple point) are far below temperatures that might be encountered in their use even if they had lower freezing points. Methyl chloride has a freezing point of —144° F.

CRITICAL TEMPERATURE

The critical temperature of a refrigerant, the highest temperature at which it can be condensed to a liquid regardless of higher pressure, should be above the highest condensing temperature that might be encountered. With air cooled condensers this would be above about 130° F.

Losses of efficiency with various refrigerants as occasioned by superheating on compression and throttling expansion of liquid are higher when critical temperature is low. These factors are discussed in detail and under specific heat of vapor.

All common refrigerants have satisfactorily high critical temperatures except carbon dioxide (88.2° F.) and ethane (89.9° F.) and these refrigerants require condensers cooled by water at a temperature below their respective critical temperatures.

LATENT HEAT OF EVAPORATION

A refrigerant should have a high latent heat of evaporation per unit of weight so that weight of refrigerant circulated to produce a given refrigeration effect may be small, and to keep at a minimum, for the sake of safety and cost, the required weight of refrigerant charge in a system.

Latent heat is even more important when considered in light of its relation to volume of liquid required and net refrigerating effect, but as other factors enter into the determination of these, they are discussed separately.

Methyl chloride with a latent heat of evaporation of 179.0 at 5° F. stands high in this factor among refrigerants in common use.

SPECIFIC HEAT OF LIQUID AND NET REFRIGERATING EFFECT

Low specific heat of liquid is desirable in a refrigerant. If the ratio of latent heat to specific heat of liquid is low, relatively high proportion of the latent heat may be required and used in lowering the temperature of the liquid from condenser temperature to evaporator temperature. This results in a small net refrigerating effect per pound of refrigerant circulated and, assuming other factors remain the same, re-

(Concluded on Page 23, Column 1)

THE BUYER'S GUIDE

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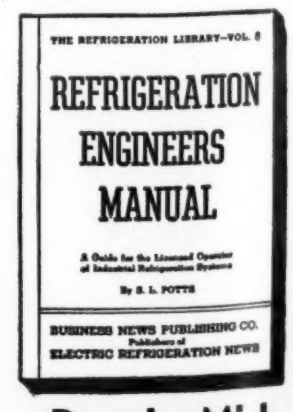
It begins with the principles and methods of refrigeration, discusses refrigerants, deals in detail with the component parts of a refrigeration system, considers the operation of compression and absorption systems, discusses indirect expansion systems, gives data on the manufacture of artificial ice, and discusses in detail cooling towers and spray ponds.
There are 29 tables in the book which supply a ready reference source for the plant operator. The book contains more than 110 illustrations of parts, hook-ups, and uses.

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Characteristics of Methyl Chloride Compared to 'Ideal' Refrigerant

(*Concluded from Page 22, Column 5*)
duces capacity and lowers efficiency.

When ratio of latent to specific heat is very low, it is often advisable for the sake of capacity and economy to precool the liquid before evaporation by heat interchanging with the cool gases leaving the evaporator. This, of course, ordinarily raises the temperature of gas entering the compressor and the compressed gas then carries more than the normal amount of superheat, necessitating larger condenser surface than without the interchanger and increasing work of compression.

In the common type of practical refrigeration machines, expansion of high pressure liquid to a mixture of lower pressure-lower temperature gas and liquid takes place through a throttling device such as an expansion valve.

In this process, energy available from the expansion not only is not recovered as useful work but also, through its not being allowed to perform external work, reduces the net refrigerating effect.

The throttling change takes place irreversibly at constant enthalpy (constant "total heat" but with an increase in entropy) whereas ideally the liquid and "flash" gas should be expanded adiabatically (reversibly with no change in heat content, constant entropy) so that energy available from the pressure volume would be used in performing work rather than in reducing refrigerating effect. Adiabatic expansion with performance of external work abstracts energy from the system and temperature is lowered; in a simple throttling or free expansion of a gas no external work is performed and the change takes place at constant temperature or nearly so.

However, because of engineering limitations, refrigeration systems generally employ complete throttling expansion of liquid in spite of the efficiency decrease. Overall theoretical efficiencies are further discussed and data on expansion losses are given under "specific heat of vapor," the next section.

The net refrigerating effect per pound of methyl chloride is relatively high; methyl chloride has high ratio of latent heat to "differential heat of liquid." The latter is proportional to specific heat of liquid and equals the difference between heats of saturated liquid at condenser and evaporator temperatures.

LOW DENSITY, GAS AND LIQUID

Densities of the ideal refrigerant in gas and liquid states would be low. Pressure drop in passing a given volume of fluid through orifices increases with increased density as well as with increased viscosity.

If efficiency is not to be impaired, orifice openings and tubing must be increased in size so that pressure drops are not excessive. This increases cost of equipment and may involve engineering difficulties due to space limitations.

This fluid flow disadvantage of high density liquid is offset when refrigerating effect per pound is comparatively high, since higher density then results in comparatively lower volume circulated.

When condensing unit and evaporator are located on different levels, a low density of liquid is desirable so that the pressure (power) required to raise the head of liquid may be a minimum.

Cost per pound being the same, high density liquids cost more per unit of volume and, in general, charges of equal volume rather than of equal weight are required of different refrigerants for various applications.

Denser refrigerants tend to place higher starting torques on motors.

Methyl chloride shows relatively low densities (relatively high specific volumes) of both liquid and vapor.

VOLUME OF LIQUID CIRCULATED

Volume of liquid required to be circulated for a given refrigeration effect should be low, to avoid fluid flow (pressure drop) problems and to keep down the size of the required refrigerant charge; a system charged with a refrigerant having a large cooling effect per unit of volume has more reserve to take care of sudden heavy loads and the same factor along with good heat transfer and low operating temperature appears to be related to quick freezing qualities.

In small capacity machines, volume of liquid circulated should not be so low as to present difficult problems in accurately controlling its flow through expansion valves, or other types of liquid metering devices.

Volumes of methyl chloride circulated are not excessive and at the same time are not so low as to interfere with accurate control in the smallest capacity systems. Satisfactory control in small systems is obtained with sulphur dioxide with lower volumes circulated. Ammonia, however, with still lower volumes presents a more difficult control problem for application to small machines.

With a given net refrigerating effect per pound, high density of liquid favors a low volume; however it also tends to increase volume circulated by lowering net refrigerating effect.

VISCOSITIES, GAS AND LIQUID (FLUID FLOW FACTORS)

To keep pressure drops, or sizes of tubing, orifices and valves, at a minimum, viscosities of both gaseous and liquid refrigerant should be low. Viscosities of methyl chloride are satisfactorily low under operating conditions. Low viscosities also contribute toward good heat transfer.

Pressure drops or orifice sizes are dependent upon volumes circulated and densities (specific volumes) as well as viscosities.

For a given pressure drop and a given capacity, liquid sulphur dioxide requires about the same size orifices and tubing as methyl chloride, in spite of lower volume circulated, because of higher density and higher viscosity.

Liquid Freon-12 requires larger orifices and tubing. Liquid ammonia with low viscosity, low density and low volume requirement does not need orifices nearly as large as does methyl chloride.

Tubing sizes for methyl chloride and sulphur dioxide vapors are about the same. Freon-12 vapors being quite dense require larger tubing.

Carbon dioxide vapors are very dense and vapor velocities must be low but volumes circulated are also low so that tubing sizes, as with the liquid, are between those required for methyl chloride and ammonia. Ammonia requires relatively small vapor lines.

HEAT TRANSFER CHARACTERISTICS

Refrigerants showing high heat conductivity and high film coefficients are desirable so that efficient use of evaporator and condenser surface may be made.

Good heat conductivity is necessary for quick cooling characteristics. Low viscosities, solubility of refrigerant in oil and high fluid velocities (if allowable without excessive pressure drop) increase heat transfer characteristics in actual operation.

Complete comparative heat transfer data for the various refrigerants are not available but actual practice has shown methyl chloride to have excellent overall heat transfer characteristics, being among the best of the commonly used refrigerants in this respect and, therefore, requiring comparatively low condenser and evaporator surfaces for given applications.

Determination of evaporation coefficients of heat transfer for water and methylene chloride have been made and the coefficients for water shown to be roughly twice as high as those for methylene chloride.

The coefficients for ammonia are said to be about the same as for water; those for sulphur dioxide between those of methylene chloride and ammonia; those for a large number of organic refrigerants about the same as for methylene chloride.

PRESSURE DIFFERENTIAL BETWEEN HIGH AND LOW SIDE RATIO OF COMPRESSION

The difference between high and low pressures of a refrigerant under a given set of conditions should preferably be low.

The lower the pressure difference or the lower the pressure ratio of compression (ratio of high side to low side absolute pressure), the lower the capacity loss due to re-expansion of clearance volume gas in cylinder, the lower the throttling losses, the lower the slippage of gas past the piston from high to low side and the easier it is to control operation of liquid valve between high and low sides.

As before mentioned, superheat power loss also depends upon ratio of compression, increasing as the ratio increases.

Methyl chloride shows satisfactory low pressure differences. Gas slippage of methyl chloride is even low enough to allow its use in well designed rotary compressors where this factor is of prime importance. Pressure difference values for various refrigerants follow very closely the order of their vapor pressures at a given temperature.

SUPERHEATING OF LIQUID

Superheating of refrigerant or of refrigerant-oil mixtures in evaporators so that refrigerant does not boil off is, of course, undesirable. Superheating may occur with all refrigerants, particularly in the presence of oil, and logged evaporators are the result.

Provision must be made to avoid oil accumulation and ebullition aids may be needed. The possibility of superheating in evaporators with little or no oil present probably would be remote.

(*To Be Concluded in a Later Issue*)

6 Chattanooga Dealers Aid in 'Home Beautiful' Campaign

CHATTANOOGA, Tenn.—Six local refrigeration, air-conditioning, and ventilating dealers participated in a "Home Beautiful" campaign inaugurated June 30 by the Chattanooga Times.

The dealers are:

Chattanooga Blow Pipe & Roofing Co., (Torrid Zone Aire-Flo); Clemons Bros. Co., (General Electric); James Supply Co. (Buffalo Breez-Air and Rex Airate); Loveman's (York air conditioning); Rhodes-Jones Furniture Co., (Norge); and Terrell Electric Co., (Westinghouse).

Pleasant Becomes Executive Of Grand Rapids Brass

GRAND RAPIDS, Mich.—H. E. Pleasant, formerly vice president and general manager of Winters & Crampton Corp., recently resigned his position to become vice president and sales manager of the Grand Rapids Brass Co., manufacturer of refrigerator hardware.

In addition to his position with Winters & Crampton, Mr. Pleasant's previous connections in the refrigeration industry include positions with Westinghouse Electric & Mfg. Co., Servel, Inc., and National Lock Co.

Pearson Co. Names Bedell Refrigeration Supervisor

INDIANAPOLIS — Ted Bedell, formerly active in the refrigeration field in the east, has been appointed supervisor of the refrigeration department of Pearson Co., Inc., according to C. L. Kittle, manager.

New Orleans Norge Firm Leases New Quarters

NEW ORLEANS—Norge Products of Louisiana, Inc. has taken a five-year lease on a large two-story building at 4638 S. Carrollton Ave. here.

Portland's Century Co. Sets Up Appliance Dept.

PORTLAND, Ore.—Pacific Century Co. has marked its entry into the electrical appliance field by changing its name to Century Co., moving to larger quarters at 223 S.W. Sixth St., and setting up an electrical appliance department under the direction of Jesse B. Weed, veteran of local electrical merchandising.

Richard Willis Opens Own Baltimore Dealership

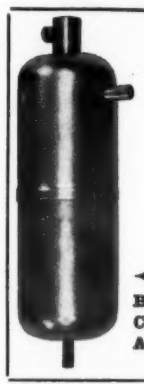
BALTIMORE—Richard Willis, formerly manager and buyer for O'Neill & Co., appliance firm here, opened his own store under the trade name of The Branch Appliance Co.

The firm will handle the Kelvinator line of appliances exclusively.

New Hampshire Passes Fair Trade Bill

CONCORD, N. H.—A "fair trade" bill designed to prohibit price cutting on nationally advertised and trademarked merchandise recently was passed by the state senate by a vote of 11 to 10. The measure, which previously had been passed by the house, went to the governor where it was given final approval.

THE BUYER'S GUIDE



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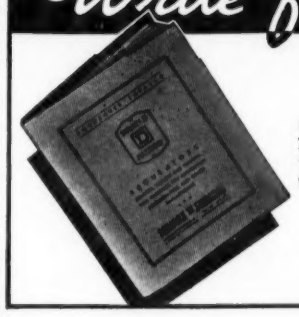

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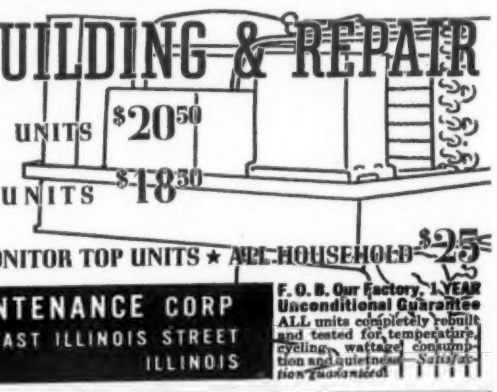

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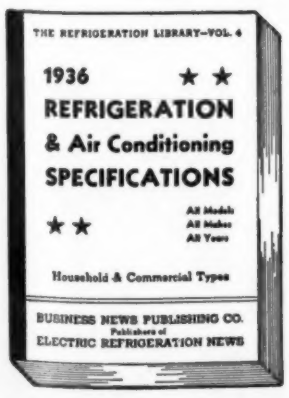

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